Hilary Spurling on Matisse and His Models

OCTOBER 2005

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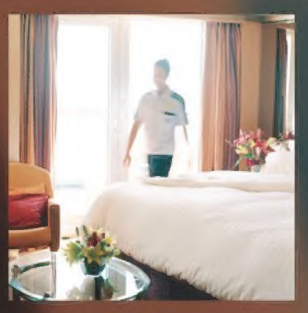

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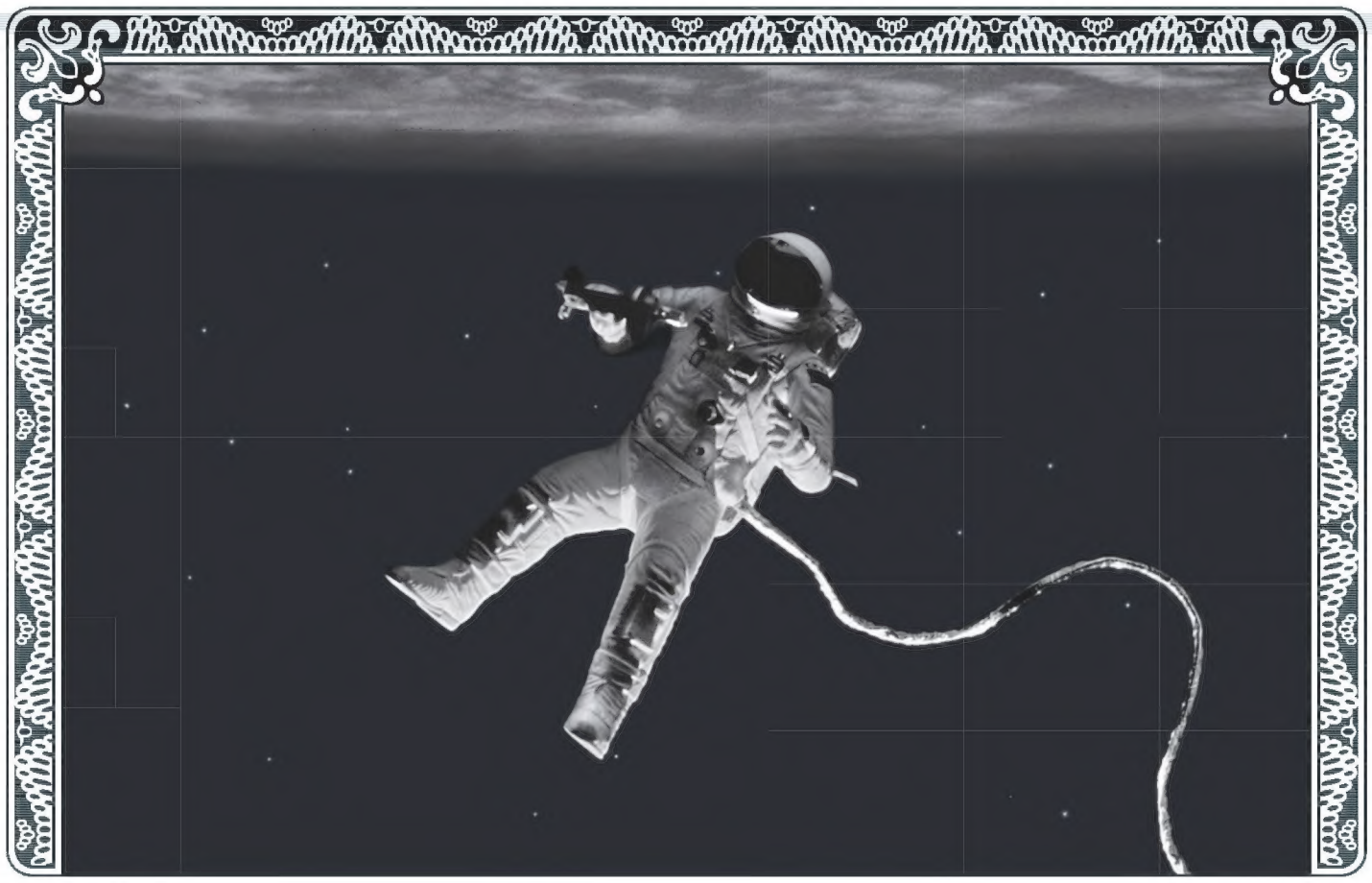

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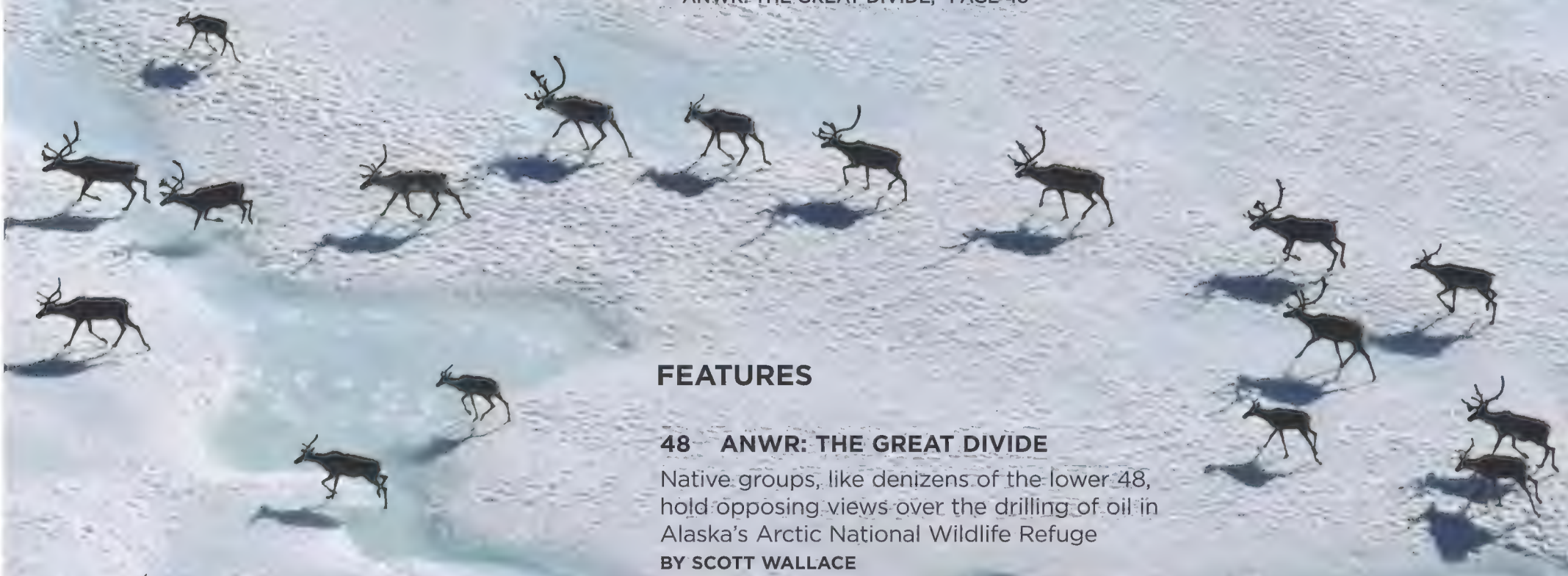
OCTOBER 2005 VOLUME 36, NUMBER 7

The Porcupine River caribou herd is the unlikely focus of one of the most divisive environmental debates in our nation's history: whether ANWR should be opened up for oil exploration.

—"ANWR: THE GREAT DIVIDE," PAGE 48



THIS PAGE: ANWR's coastal plain provides protection from predators for the nearly 40,000 caribou calves born there each year. Photograph by George F. Mobley / National Geographic / Getty Images.

COVER: Caribou remain the symbol of the fight over the Arctic National Wildlife Refuge. Photograph by Jim Lo Scalzo / Aurora. Inset: Dallas and John Heaton / SC Photos / Alamy.

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THIS SIDE OF PARODIES

Breeding an überbanana that fends off lethal diseases while also meeting the exacting requirements of growers and consumers isn't rocket science. It's harder than that.

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THIS PAGE: The $4 billion-a-year banana export trade is almost entirely based on the Cavendish variety, king of the American supermarket. Photograph by Peter Essick / Aurora.

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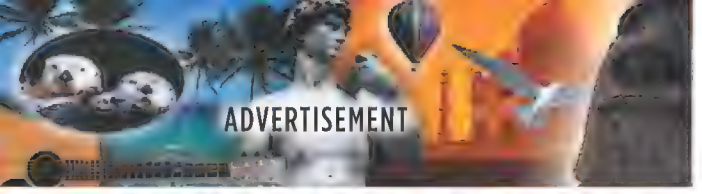

CULTURE SPOTTER

OCTOBER 2005 - FEBRUARY 2006

Welcome to CultureSpotter, a monthly listing of some of the most interesting cultural events around the globe.
(Dates subject to change)

December 15 – April 23
TUTANKHAMUN AND THE GOLDEN AGE OF THE PHARAOHS EXHIBIT
Fort Lauderdale, Florida
www.sunny.org/tut/

December 26
JUNKANOO, AFRO-CARIBBEAN CELEBRATION
Nassau, Bahamas
www.junkanoo.com

December 26 – 30
HUMORFESTIVAL
Deventer, Holland
www.holland.com/us

January 1
NEW YEAR'S DAY CONCERT IN VIENNA
Vienna, Austria
www.viennaconcerts.com

January 9 - 15
25TH ANNUAL ARTS WEEK PERFORMANCES AND GALA CELEBRATION
Miami, Florida
www.NFAA.ARTSawards.org

January 28 – February 12
FETE DES NEIGES WINTER FESTIVAL
Montreal, Canada
www.fetedesneiges.com/en

February 26
INTERNATIONAL CARNIVAL PARADE OF RIJEKA
Rijeka, Croatia
www.ri-karneval.com.hr/english/

FEATURED LISTINGS

October 28 - 31
GUINNESS JAZZ FESTIVAL
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www.corkjazzfestival.com

October 2005 - December 2006
CELEBRATE BELFAST
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www.belfastcity.gov.uk/belfast2006
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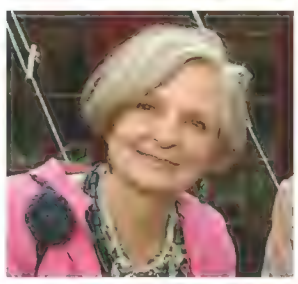
FROM ALASKA TO FRANCE, KINDRED SPIRITS FIND COMMON GROUND **BY CAREY WINFREY**

ALTHOUGH THE TWO Native Alaskan groups who live closest to the Arctic National Wildlife Refuge (ANWR) remain divided over whether drilling for oil should be permitted there—a question that the U.S. Congress plans to take up this fall—they have much in common, says Scott Wallace, author of "Divided Over ANWR," p. 48. Both the Gwich'in, who oppose drilling, and the Inupiat, who support it, depend on animals for food, clothing and their sense of cultural identity. For the Gwich'in, it's migratory herds of caribou that provide most of this sustenance. For the Inupiat, it's the bowhead whales that migrate off the Arctic coast. "I think the Gwich'in and the Inupiat, despite their differences, are united in their fear of what development could mean for the animals they subsist on," says Wallace.

Canine (with growers in Africa): In search of a better-tasting banana.

"I'M AS FOND of a banana sliced on cereal as the next guy," says Craig Canine, who wrote our story on America's favorite fruit ("Building a Better Banana," p. 96), "but I hadn't tasted a really good banana until I went to rural Cameroon, in Africa, and tried a Gros Michel ('Big Mike')." Compared with the Central American Cavendish, which is the only variety familiar to most Americans, Big Mike's flavor, Canine says, "is richly complex, much less cloyingly sweet. There are hints of berries and a pleasant understated tartness. Panama disease, which wiped out most Central American Gros Michels in the 1940s and '50s, has robbed us of a better-tasting banana."

Now the Cavendish is facing a similar fate. Several different pathogens threaten it, prompting farmers to use ever more pesticides. No one wants to see the Cavendish wiped out, but, Canine suggests, it would be nice if American consumers had a few more banana varieties from which to choose.



Spurling: Remarkable and powerful women.

HILARY SPURLING, whose second volume of her ambitious biography of Henri Matisse (*Matisse the Master*) was published in September, writes about the artist's relationships with his models for us ("Matisse and His Models," p. 72). "They were all, without exception, remarkable and powerful women," Spurling says. "He liked women who were his equals, women who could box back. That's of course why so many of them look so modern to us." What most surprised Spurling "was the models' extraordinary strength and determination—their power and presence. I talked to Lydia [Delectorskaya], his last model, at the end of her life. She would have become a doctor if the Russian Revolution hadn't happened. She gave herself to the cause of Matisse and his work, and it was his great good fortune." And ours.

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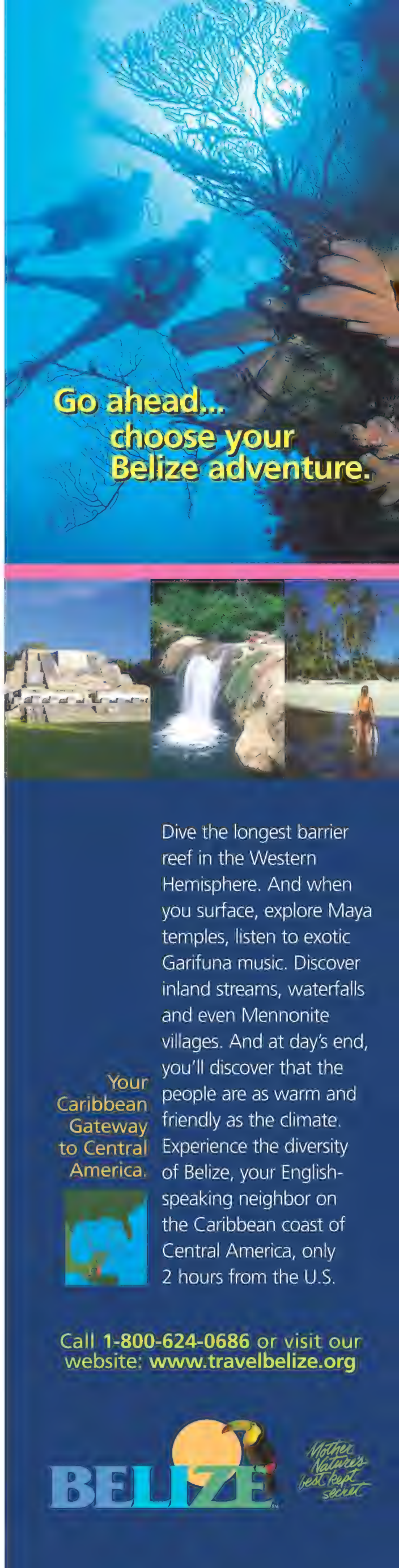
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HISTORY TELLS the stories of people, and so do portraits. Through the windows of these works of art, we can observe its grand sweep—the heroic deeds of significant protagonists, the movers and shakers of the past, and also the strivings of men and women about whose lives we know little. "Retratos: 2,000 Years of Latin American Portraits," an ambitious exhibition on view from October 21 until January 8, 2006, at the Smithsonian's International Gallery, offers fascinating glimpses of these past lives. It allows museumgoers to look at people in Latin American history eye to eye, in many cases for the first time. (Much of the exhibition can be seen at www.retratos.org.)

Consider, for instance, the stately portrait of Bernardo de Gálvez when he was viceroy of Mexico. While Gálvez's name does not appear in many textbooks, his contribution to American history was fundamental. His portrait, or *retrato*, a word derived from a Latin root word meaning a re-creation, commands our attention. When the Thirteen Colonies revolted against Britain's rule, Gálvez was the governor of then-Spanish Louisiana. Naval and land forces under his leadership beat the British at Mobile Bay, in 1780, and wrested control of West Florida from them. Gálvez's offensive distracted the British, drawing their ships and troops into the Gulf of Mexico—and away from their Colonies. Without Gálvez in the south, Gen. George Washington would surely have encountered a much fiercer and far deadlier fight at the decisive Battle of Yorktown.

Some of the portraits in "Retratos" were created by celebrated artists such as Fernando Botero, Diego Rivera and Frida Kahlo; others are by artists either unknown to us or anonymous. For the past three years, curators at the Smithsonian National Portrait Gallery worked closely with their colleagues at the San Antonio Museum of Art and El Museo del Barrio, in New York City. Together, and with the generous support of the Ford Motor Company Fund and the Smithsonian Center for Latino Initiatives, they drew from the rich stores of 76 public and private art collections located in 15 countries, and assembled an exhibition that has already visited three museums, in New York City, San Diego and Miami. From February 4 until April 30, 2006, it will be at the San Antonio Museum of Art.

"Retratos" presents a rich and vivid sense of Latin America's history and culture as it showcases the region's abundant portraiture, from before the arrival of Europeans through the modern era and up to the year 2000. The earliest portraits featured are the wondrously evocative earthenware vessels made by the pre-Columbian Moche peoples between A.D. 100 and A.D. 600. The Moche lived in what is now Peru and rendered likenesses so faithfully that scholars have been able to recognize individuals at various stages of their lives. Also on display is the oldest-known signed portrait in South America, an oil painting completed in 1599 that represents three descendants of African slaves, each dressed in Spanish finery—ruffles, luxurious silks and gold jewelry. An 1830 portrait of Simón Bolívar speaks to the early 19th-century search for independence; then toward the end of the exhibition, a pair of contemporary portraits depict workers in sugar-cane fields. The subjects, a young boy and girl, are drawn with a process that begins with granulated sugar on black paper.

Elisa Saldívar de Gutiérrez Roldán, Diego Rivera, oil on canvas, 1946.

Too often we forget how intimately connected the history of Latin America is to that of the United States. This unique exhibition of so many marvelous representations of Latin Americans will do much to forge a fuller sense of our shared history. And it reminds us of how Latinos continue to contribute to the cultural wealth of our nation.

Lawrence M. Small
SECRETARY OF THE SMITHSONIAN INSTITUTION

D.A. PETERSON; PHOTOGRAPHY BY JOSÉ I. GLEZ MANTEROLA / BANCO DE MÉXICO DIEGO RIVERA AND FRIDA KAHLO MUSEUMS TRUST

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LETTERS

Readers respond to the August issue:

DISSENTERS DISQUIETED

J. ROBERT OPPENHEIMER recommended using nuclear bombs against Japan to hasten the end of the war ("Building the Bomb"), but later said he regretted it. What is less well known is that he also squelched a petition to President Truman that questioned the morality of using the weapons on Japanese cities. Led by physicist Leo Szilard, the petition was signed by 155 Manhattan Project scientists at labs in Oak Ridge, Tennessee, and Chicago. Many urged that the bombs first be demonstrated and then locked under international controls to forestall a nuclear arms race. Oppenheimer banned the petition at Los Alamos and alerted Gen. Leslie Groves, the project's military head, who countered by ordering a poll of project scientists. Chagrined that 83 percent favored a demonstration, Groves delayed the petition's delivery to Washington. Even after nuclear bombs were used, Groves forbade Szilard from publishing the petition by having it classified "Secret." It wasn't declassified until 1961.

WILLIAM LANOUETTE
WASHINGTON, D.C.

A WAR'S END

I WAS IN TEARS reading through the stories about the end of the war ("It's Over!"). I couldn't help but think of my late father. He was in San Diego in the Navy in World War II, awaiting involvement in the first wave of the planned invasion of Japan, when word came of the bombs and surrender. He told me I wouldn't be here but for Nagasaki and Hiroshima, since he believed that being in the first wave would have been certainly fatal. Thank you for adding to the story of that generation.

KEN T. KERN
MINNEAPOLIS, MINNESOTA

THE ACCOUNTS of the end of World War II should be required reading for today's children. Such firsthand reactions present the human aspects of the war better than any textbook. My husband and I have been interviewed twice by granddaughters, who are half-Japanese and live in Tokyo, on what we were doing during the war (collecting newspapers and grease, using food coupons, buying war bonds) and what we thought of the use of the atomic bomb. The girls' other grandparents live near Hiroshima and have very different recollections of 1945. Schoolchildren in the United States should have opportunities to hear or read a variety of experiences and viewpoints on the war.

SUZANNE DANDOY
DEPOE BAY, OREGON

I ENJOYED VERY MUCH the photo of Times Square August 15, 1945, because I was there! I was in the Coast Guard boot camp on Manhattan Beach, Brooklyn. We were given liberty that night. I started out in my spotless "whites," and when I returned to base very little white remained, as it was covered with lipstick. Every girl who saw us as we passed by would give us great big kisses.

JOSEPH HERNANDEZ
BURBANK, CALIFORNIA

THE WAR'S AFTERMATH was painful for many returning G.I.'s. At the time, my father and mother were jazz musicians in New York City. My dad, Joe Marsala, played clarinet, and my mother, Adele Girard, played harp. During breaks my father said he was often approached by a lonely "G.I. Joe" and told a sad tale. Many a young man came back from overseas hoping to resume a relationship only to find that the woman of his dreams had gone off with someone else. My father penned a song for these guys, "Don't Cry Joe (Let Her Go, Let Her Go, Let Her Go)," published in 1947. It was recorded by Gordon Jenkins and Frank Sinatra. Though it was not one of Sinatra's best-known recordings, I still find people of that era who remember "Don't Cry Joe."

ELEISA TRAMPLER
DENVER, COLORADO

ALIEN INVASION

I CHUCKLED AS I READ Ann Hodgman's gardening philosophy ("Give Weeds a Chance"), as it matches my own. I, too, learned that weeds are just wildflowers growing where someone doesn't want them, but they have a beauty all their own. Since people have cleared out the native wildflowers in so many places, I must accept the "aliens" growing in my lawn and flower beds. Oh yes, my "lawn" gets mowed, but those clever plants have learned to duck by not growing as tall.

ED BRISTOW
ABSECON, NEW JERSEY

Correction: Our piece about sharks ("Shark") mischaracterized the sinking of the USS Indianapolis *in World War II. She was a heavy cruiser and was sunk in the western Pacific.*

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October 1970

THE YEAR WE WERE BORN

A LOOK BACK AT THE WORLD IN SMITHSONIAN MAGAZINE'S FIRST YEAR

CELEBRATING 35 YEARS SMITHSONIAN MAGAZINE

WHERE ARE THEY NOW?

BUFFY SAINTE-MARIE

FOLK SINGER / ACTIVIST

Says Sainte-Marie on the state of Native Americans today: "Of course there are huge improvements."

BUFFY SAINTE-MARIE, Native American folk singer and anti-Vietnam War activist, told the *Los Angeles Times* in October 1970 that Indian children "are not taught to be proud they're Indian. Here the melting pot stands with arms open—if you're willing to get bleached first." The singer, a member of the Cree tribe who is known for writing such songs as "Universal Soldier" and "Up Where We Belong," has spent much of her time since the 1960s visiting Indian reservations in Canada and the United States. "I needed to shine a spotlight on the needs and the value of people in Indian Country," she says today.

Sainte-Marie also regularly appeared with son Dakota, now 29, on public television's "Sesame Street" from 1976-1981.

At age 64, Sainte-Marie still tours, mostly in Canada. She and her husband, Chuck Wilson, live in Hawaii, where she heads a Native American Studies program. —*MIMI KIRK*

Garry Trudeau's comic strip, *Doonesbury,* debuts in about two dozen newspapers October 26. Its witty, sometimes biting social and political commentary earns Trudeau a Pulitzer Prize for Editorial Cartooning in 1975, and in the same year fellow satirist Art Buchwald calls it "the best comic strip that's come along in a long time." Today, the strip appears in nearly 1,400 newspapers worldwide.

IN THE NEWS

On October 24, Dr. Salvador Allende, a Marxist-Leninist, is elected president of Chile. His socialist reforms and friendship with Fidel Castro strain relations with the United States, and at age 65, Allende dies in a 1973 coup d'état led by Augusto Pinochet and condoned by the CIA. Pinochet's repressive regime, in which an estimated 1,100 political opponents were "disappeared," ended in March 1990. Pinochet, 89, is expected to appeal a July ruling that stripped him of immunity from prosecution in a human rights case.

Egypt's National Assembly nominates interim president Mohamed Anwar el-Sadat to succeed the late Gamal Abdel Nasser as president October 7. In a national referendum a week later, Sadat, who promises to take back parts of Israel for the Palestinians, receives 90 percent of the vote. In 1978 Sadat signed the Camp David Accords with Israeli prime minister Menachem Begin. Under its terms, Israel returned the Sinai Peninsula to Egypt in exchange for peace. Sadat was assassinated by Egyptian Army members in 1981. He was 62.

THE LIST

1970 Tony Awards

Drama: ***Borstal Boy***
Musical: ***Applause***
Actor, Drama: Fritz Weaver, ***Child's Play***
Actress, Drama: Tammy Grimes, ***Private Lives***
Actor, Musical: Cleavon Little, ***Purlie***
Actress, Musical: Lauren Bacall, ***Applause***
Director, Drama: Joseph Hardy, ***Child's Play***
Director, Musical: Ron Field, ***Applause***
Choreographer: Ron Field, ***Applause***

COMINGS & GOINGS

BORN:
Kelly Ripa, host/actor
October 2

BORN:
Matt Damon
Actor, October 8

DIED:
Janis Joplin, 27
Singer, October 4

DIED:
John Scopes, 70
"Monkey Trial" defendant,
October 21

"I'm happy I was able to take advantage of my visit to the United Nations to visit Disneyland too. Everybody was friendly, very friendly, and the relationship between American and Romanian people is quite good, too."

—**PRESIDENT NICOLAE CEAUSESCU OF ROMANIA**, WHO WOULD BE EXECUTED WITH WIFE, ELENA, IN DECEMBER 1989 DURING THE ROMANIAN REVOLUTION, IN THE OCTOBER 16 *NEW YORK TIMES*

CORBIS; AARON HARRIS / GP / AP / WIDE WORLD PHOTOS; RIGHT: G.B. TRUDEAU, "DOONESBURY, 1970" UNIVERSAL PRESS SYNDICATE; AFP / GETTY IMAGES; POPPERFOTO / IPNSTOCK; BETTMANN / CORBIS; STEVE SANDS / NEW YORK NEWSWIRE / CORBIS; LUIS MARTINEZ / AP / WIDE WORLD PHOTOS; PIERCE BILL / SYGMA / CORBIS; HULTON-DEUTSCH COLLECTION / CORBIS; UPI / CORBIS

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While these medications may be effective in providing pain relief, they can weaken the stomach lining, allowing stomach acid to cause an ulcer. Not all stomach ulcers cause symptoms, so talk to your doctor to see if you might be at risk for this problem.

If you're concerned about risk of a stomach ulcer caused by continuous use of your pain medication, ask your doctor about prescription NEXIUM. When taken daily, NEXIUM has been proven to help reduce the risk of stomach ulcers associated with certain pain medications. NEXIUM is not a pain medication. Your results may vary.

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Please read this summary carefully, and then ask your doctor about NEXIUM. No advertisement can provide all the information needed to prescribe a drug. This advertisement does not take the place of careful discussions with your doctor. Only your doctor has the training to weigh the risks and benefits of a prescription drug for you.

NEXIUM® (esomeprazole magnesium)

20-mg, 40-mg Delayed-Release Capsules

BRIEF SUMMARY Before prescribing NEXIUM, please see full Prescribing Information. **INDICATIONS AND USAGE** NEXIUM is indicated for the short-term treatment (4 to 8 weeks) in the healing and symptomatic resolution of diagnostically confirmed erosive esophagitis; the maintenance of symptom resolution and healing of erosive esophagitis (controlled studies do not extend beyond 6 months); and for the treatment of heartburn and other symptoms associated with GERD; and for risk reduction of NSAID-associated gastric ulcer. **CONTRAINDICATIONS** NEXIUM is contraindicated in patients with known hypersensitivity to any component of the formulation or to substituted benzimidazoles. **PRECAUTIONS** Symptomatic response to therapy with NEXIUM does not preclude the presence of gastric malignancy. Atrophic gastritis has been noted occasionally in gastric corpus biopsies from patients treated long-term with omeprazole, of which NEXIUM is an enantiomer. **Information for Patients** NEXIUM Delayed-Release Capsules should be swallowed whole and taken at least one hour before meals. For patients who have difficulty swallowing capsules, one tablespoon of applesauce can be added to an empty bowl and the NEXIUM Delayed-Release Capsule can be opened, and the pellets carefully emptied onto the applesauce. The pellets should be mixed with the applesauce and then swallowed immediately. The applesauce used should not be hot and should be soft enough to be swallowed without chewing. The pellets should not be chewed or crushed. The pellet/applesauce mixture should not be stored for future use. Antacids may be used while taking NEXIUM. **Drug Interactions** Esomeprazole is extensively metabolized in the liver by CYP2C19 and CYP3A4. *In vitro* and *in vivo* studies have shown that esomeprazole is not likely to inhibit CYPs 1A2, 2A6, 2C9, 2D6, 2E1 and 3A4. No clinically relevant interactions with drugs metabolized by these CYP enzymes would be expected. Drug interaction studies have shown that esomeprazole does not have any clinically significant interactions with phenytoin, warfarin, quinidine, clarithromycin or amoxicillin. Post-marketing reports of changes in prothrombin measures have been received among patients on concomitant warfarin and esomeprazole therapy. Increases in INR and prothrombin time may lead to abnormal bleeding and even death. Patients treated with proton pump inhibitors and warfarin concomitantly may need to be monitored for increases in INR and prothrombin time. Esomeprazole may potentially interfere with CYP2C19, the major esomeprazole metabolizing enzyme. Coadministration of esomeprazole 30 mg and diazepam, a CYP2C19 substrate, resulted in a 45% decrease in clearance of diazepam. Increased plasma levels of diazepam were observed 12 hours after dosing and onwards. However, at that time, the plasma levels of diazepam were below the therapeutic interval, and thus this interaction is unlikely to be of clinical relevance. Coadministration of oral contraceptives, diazepam, phenytoin, or quinidine did not seem to change the pharmacokinetic profile of esomeprazole. Studies evaluating concomitant administration of esomeprazole and either naproxen (non-selective NSAID) or rofecoxib (COX-2 selective NSAID) did not identify any clinically relevant changes in the pharmacokinetic profiles of esomeprazole or these NSAIDs. Esomeprazole inhibits gastric acid secretion. Therefore, esomeprazole may interfere with the absorption of drugs where gastric pH is an important determinant of bioavailability (eg, ketoconazole, iron salts and digoxin). **Carcinogenesis, Mutagenesis, Impairment of Fertility** The carcinogenic potential of esomeprazole was assessed using omeprazole studies. In two 24-month oral carcinogenicity studies in rats, omeprazole at daily doses of 1.7, 3.4, 13.8, 44.0 and 140.8 mg/kg/day (about 0.7 to 57 times the human dose of 20 mg/day expressed on a body surface area basis) produced gastric ECL cell carcinoids in a dose-related manner in both male and female rats; the incidence of this effect was markedly higher in female rats, which had higher blood levels of omeprazole. Gastric carcinoids seldom occur in the untreated rat. In addition, ECL cell hyperplasia was present in all treated groups of both sexes. In one of these studies, female rats were treated with 13.8 mg omeprazole/kg/day (about 5.6 times the human dose on a body surface area basis) for 1 year, then followed for an additional year without the drug. No carcinoids were seen in these rats. An increased incidence of treatment-related ECL cell hyperplasia was observed at the end of 1 year (94% treated vs 10% controls). By the second year the difference between treated and control rats was much smaller (46% vs 26%) but still showed more hyperplasia in the treated group. Gastric adenocarcinoma was seen in one rat (2%). No similar tumor was seen in male or female rats treated for 2 years. For this strain of rat no similar tumor has been noted historically, but a finding involving only one tumor is difficult to interpret. A 78-week mouse carcinogenicity study of omeprazole did not show increased tumor occurrence, but the study was not conclusive. Esomeprazole was negative in the Ames mutation test, in the *in vivo* rat bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. Esomeprazole, however, was positive in the *in vitro* human lymphocyte chromosome aberration test. Omeprazole was positive in the *in vitro* human lymphocyte chromosome aberration test, the *in vivo* mouse bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. The potential effects of esomeprazole on fertility and reproductive performance were assessed using omeprazole studies. Omeprazole at oral doses up to 138 mg/kg/day in rats (about 56 times the human dose on a body surface area basis) was found to have no effect on reproductive performance of parental animals. **Pregnancy** *Teratogenic Effects. Pregnancy Category B* Teratology studies have been performed in rats at oral doses up to 280 mg/kg/day (about 57 times the human dose on a body surface area basis) and in rabbits at oral doses up to 86 mg/kg/day (about 35 times the human dose on a body surface area basis) and have revealed no evidence of impaired fertility or harm to the fetus due to esomeprazole. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed. Teratology studies conducted with omeprazole in rats at oral doses up to 138 mg/kg/day (about 56 times the human dose on a body surface area basis) and in rabbits at doses up to 69 mg/kg/day (about 56 times the human dose on a body surface area basis) did not disclose any evidence for a teratogenic potential of omeprazole. In rabbits, omeprazole in a dose range of 6.9 to 69.1 mg/kg/day (about 5.5 to 56 times the human dose on a body surface area basis) produced dose-related increases in embryo-lethality, fetal resorptions, and pregnancy disruptions. In rats, dose-related embryo/fetal toxicity and postnatal developmental toxicity were observed in offspring resulting from parents treated with omeprazole at 13.8 to 138.0 mg/kg/day (about 5.6 to 56 times the human doses on a body surface area basis). There are no adequate and well-controlled studies in pregnant women. Sporadic reports have been received of congenital abnormalities occurring in infants born to women who have received omeprazole during pregnancy. **Nursing Mothers** The excretion of esomeprazole in milk has not been studied. However, omeprazole concentrations have been measured in breast milk of a woman following oral administration of 20 mg. Because esomeprazole is likely to be excreted in human milk, because of the potential for serious adverse reactions in nursing infants from esomeprazole, and because of the potential for tumorigenicity shown for omeprazole in rat carcinogenicity studies, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother. **Pediatric Use** Safety and effectiveness in pediatric patients have not been established. **Geriatric Use** Of the total number of patients who received NEXIUM in clinical trials, 1459 were 65 to 74 years of age and 354 patients were 75 years of age. **ADVERSE REACTIONS** The safety of NEXIUM was evaluated in over 15,000 patients (aged 18-84 years) in clinical trials worldwide including over 8,500 patients in the United States and over 6,500 patients in Europe and Canada. Over 2,900 patients were treated in long-term studies for up to 6-12 months. In general, NEXIUM was well tolerated in both short- and long-term clinical trials. The safety in the treatment of healing of erosive esophagitis was assessed in four randomized comparative clinical trials, which included 1,240 patients on NEXIUM 20 mg, 2,434 patients on NEXIUM 40 mg, and 3,008 patients on omeprazole 20 mg daily. The most frequently occurring adverse events (1%) in all three groups was headache (5.5, 5.0, and 3.8, respectively) and diarrhea (no difference among the three groups). Nausea, flatulence, abdominal pain, constipation, and dry mouth occurred at similar rates among patients taking NEXIUM or omeprazole. Additional adverse events that were reported as possibly or probably related to NEXIUM with an incidence < 1% are listed below by body system: ***Body as a Whole:*** abdomen enlarged, allergic reaction, asthenia, back pain, chest pain, chest pain substernal, facial edema, peripheral edema, hot flushes, fatigue, fever, flu-like disorder, generalized edema, leg edema, malaise, pain, rigors; ***Cardiovascular:*** flushing, hypertension, tachycardia; ***Endocrine:*** goiter; ***Gastrointestinal:*** bowel irregularity, constipation aggravated, dyspepsia, dysphagia, dysplasia GI, epigastric pain, eructation, esophageal disorder, frequent stools, gastroenteritis, GI hemorrhage, GI symptoms not otherwise specified, hiccup, melena, mouth disorder, pharynx disorder, rectal disorder, serum gastrin increased, tongue disorder, tongue edema, ulcerative stomatitis, vomiting; ***Hearing:*** earache, tinnitus; ***Hematologic:*** anemia, anemia hypochromic, cervical lymphoadenopathy, epistaxis, leukocytosis, leukopenia, thrombocytopenia; ***Hepatic:*** bilirubinemia, hepatic function abnormal, SGOT increased, SGPT increased; ***Metabolic/Nutritional:*** glycosuria, hyperuricemia, hyponatremia, increased alkaline phosphatase, thirst, vitamin B12 deficiency, weight increase, weight decrease; ***Musculoskeletal:*** arthralgia, arthritis aggravated, arthropathy, cramps, fibromyalgia syndrome, hernia, polymyalgia rheumatica; ***Nervous System/Psychiatric:*** anorexia, apathy, appetite increased, confusion, depression aggravated, dizziness, hypertonia, nervousness, hypoesthesia, impotence, insomnia, migraine, migraine aggravated, paresthesia, sleep disorder, somnolence, tremor, vertigo, visual field defect; ***Reproductive:*** dysmenorrhea, menstrual disorder, vaginitis; ***Respiratory:*** asthma aggravated, coughing, dyspnea, larynx edema, pharyngitis, rhinitis, sinusitis; ***Skin and Appendages:*** acne, angioedema, dermatitis, pruritus, pruritus ani, rash, rash erythematous, rash maculopapular, skin inflammation, sweating increased, urticaria; ***Special Senses:*** otitis media, parosmia, taste loss, taste perversion; ***Urogenital:*** abnormal urine, albuminuria, cystitis, dysuria, fungal infection, hematuria, micturition frequency, moniliasis, genital moniliasis, polyuria; ***Visual:*** conjunctivitis, vision abnormal. Endoscopic findings that were reported as adverse events include: duodenitis, esophagitis, esophageal stricture, esophageal ulceration, esophageal varices, gastric ulcer, gastritis, hernia, benign polyps or nodules, Barrett's esophagus, and mucosal discoloration. Two placebo-controlled studies were conducted in 710 patients for the treatment of symptomatic gastroesophageal reflux disease. The most common adverse events that were reported as possibly or probably related to NEXIUM were diarrhea (4.3%), headache (3.8%), and abdominal pain (3.8%). Postmarketing Reports – There have been spontaneous reports of adverse events with postmarketing use of esomeprazole. These reports have included rare cases of anaphylactic reaction and myalgia, severe dermatologic reactions, including toxic epidermal necrolysis (TEN, some fatal), Stevens-Johnson syndrome, and erythema multiforme, and pancreatitis. Very rarely, hepatitis with or without jaundice has been reported. Other adverse events not observed with NEXIUM, but occurring with omeprazole can be found in the omeprazole package insert, **ADVERSE REACTIONS** section. **OVERDOSAGE** A single oral dose of esomeprazole at 510 mg/kg (about 103 times the human dose on a body surface area basis), was lethal to rats. The major signs of acute toxicity were reduced motor activity, changes in respiratory frequency, tremor, ataxia, and intermittent clonic convulsions. There have been some reports of overdosage with esomeprazole. Reports have been received of overdosage with omeprazole in humans. Doses ranged up to 2,400 mg (120 times the usual recommended clinical dose). Manifestations were variable, but included confusion, drowsiness, blurred vision, tachycardia, nausea, diaphoresis, flushing, headache, dry mouth, and other adverse reactions similar to those seen in normal clinical experience (see omeprazole package insert-**ADVERSE REACTIONS**). No specific antidote for esomeprazole is known. Since esomeprazole is extensively protein bound, it is not expected to be removed by dialysis. In the event of overdosage, treatment should be symptomatic and supportive. As with the management of any overdose, the possibility of multiple drug ingestion should be considered. For current information on treatment of any drug overdose, a certified Regional Poison Control Center should be contacted. Telephone numbers are listed in the Physicians' Desk Reference (PDR) or local telephone book. **DOSAGE AND ADMINISTRATION** Please see full Prescribing Information for recommended adult dosages and dosage adjustments for **Special Populations** for NEXIUM.

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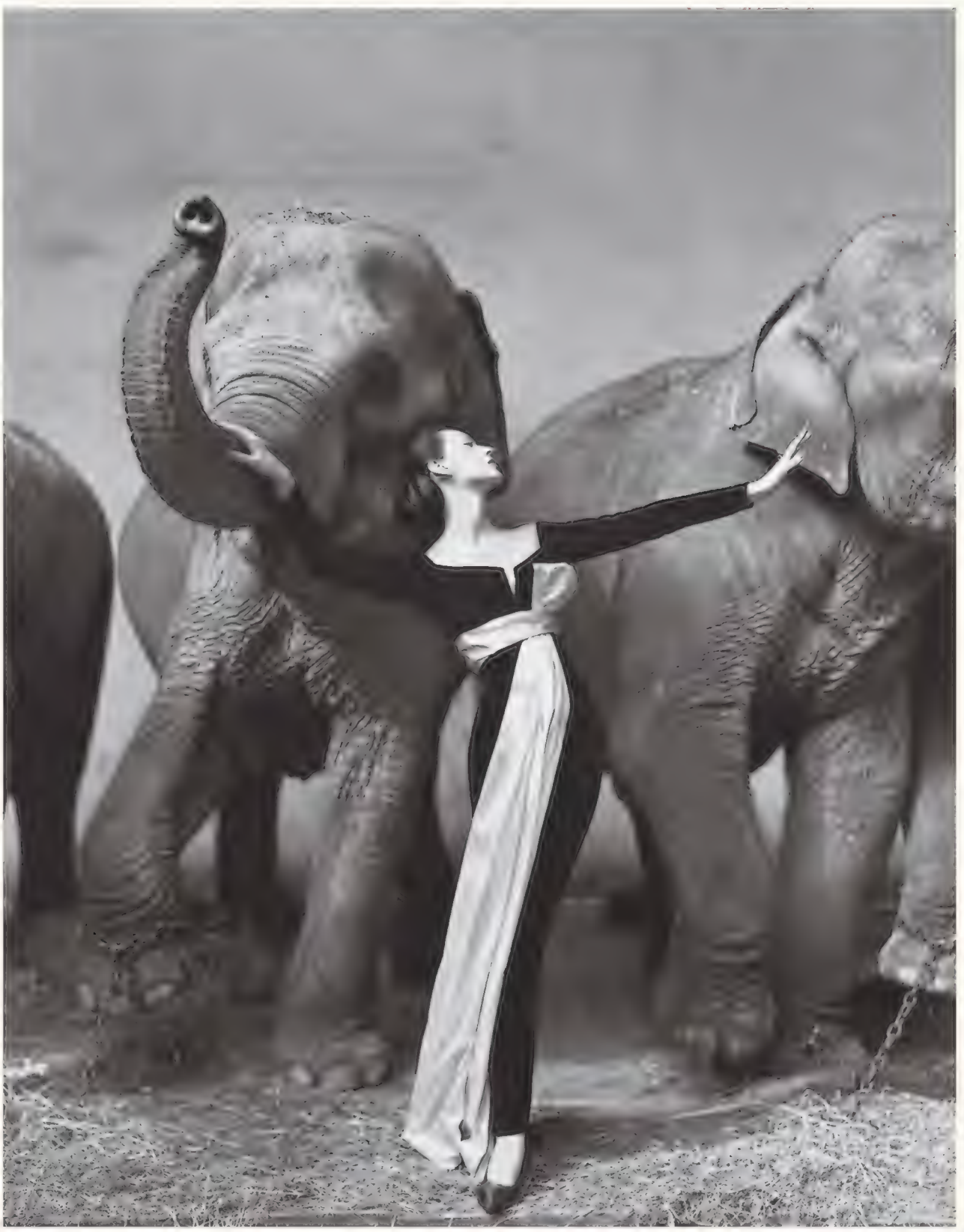

Dovima once said that with Avedon "I always knew I was going to be part of a great picture."

RICHARD AVEDON FOUNDATION

FASHION FAUX PAW

RICHARD AVEDON'S PHOTOGRAPH OF A BEAUTY AND THE BEASTS WAS MARRED, HE BELIEVED, BY ONE FAILING **BY OWEN EDWARDS**

RICHARD AVEDON, who died last October while on assignment for the *New Yorker*, was never completely satisfied with his most famous fashion photograph. A few years ago, at the opening of a San Francisco exhibition of pictures he made for *Harper's Bazaar* in the 1940s and '50s, I stood with him before a very large print of his 1955 picture *Dovima with Elephants*. Avedon shook his head.

"The sash isn't right," said the man who, along with Irving Penn, set the gold standard for American fashion photography. "It should have echoed the outside leg of the elephant to Dovima's right."

There is nothing unusual about an artist looking back on

a defining work and regretting that it isn't better, but for Avedon's admirers the self-criticism may be baffling. For many connoisseurs of his magazine work, this image, with its astonishing juxtaposition of grace and power, is among the most perfect examples of a distinct form. Yet though it was included in several books of his work—among them *Woman in the Mirror,* which is being published this month—it is conspicuously absent from the 284 photos (including three of Dovima) reprinted in the one he called *An Autobiography.*

Far be it from me to tell a man what to put in his autobiography, but this is a picture that tells an eloquent tale, about the allure of fashion, about invention, about Avedon himself and about the kind of women who were the goddesses of their day. Dovima, half Irish and half Polish, was born Dorothy Virginia Margaret Juba in 1927 and raised in the New York City borough of Queens. At 10 she contracted rheumatic fever, and she spent the next seven years confined to her home, taught by tutors. She might have been just another beautiful young woman in New York, destined to live out a life of quiet aspiration, but one day, as she waited for a friend in a building where *Vogue* had offices, she caught the eye of one of the magazine's editors. Test shots were made, and the next day Dorothy was in Penn's studio for her first modeling job.

Before long, she had made a name for herself—literally—taking the first two letters of her three given names. Dovima was said to be the highest-paid mannequin in the business (though models made much less then than they do today), and she was one of Avedon's favorites. "We became like mental Siamese twins, with me knowing what he wanted before he explained it," she once said. "He asked me to do extraordinary things, but I always knew I was going to be part of a great picture." After Dovima's death from cancer in 1990 at the age of 63 in Florida, where she'd been working as a restaurant hostess, Avedon called her "the most remarkable and unconventional beauty of her time."

Avedon, whose career spanned almost 60 years, had an uncanny ability to make meticulously planned action seem joyfully spontaneous. Where the great "decisive moment" photographer Henri Cartier-Bresson and his disciples stopped motion as they came upon it, Avedon set things in motion in order to reap serendipity. He was to models what George Balanchine was to ballerinas, but where the choreographer was famous for the precision of his dancers, Avedon brought the thrill of sports photography to the fashion pages.

A sportive thrill (above, a 1957 image) typified fashion work by Avedon (below).

Two influences shaped his career, and they could not be more dissimilar. He said his first "professional" work with a camera came when he was in the merchant marine during World War II and was required to make forensic photographs of seamen who had died. These records called for an utterly unaffected approach that later informed a portrait style some have called unkind, even merciless.

The Russian émigré art director Alexey Brodovitch first published the young Avedon's fashion photographs in *Harper's Bazaar*. Brodovitch, who was also a direct influence on Penn, loved energy and motion as well as pictures that implied an ongoing story. He championed photographers who, like Martin Munkacsi of Hungary and France's Cartier-Bresson, prowled city streets to preserve, as if in bronze, people riding bikes and jumping over rain puddles. Munkacsi's pictures of a model running on the beach in *Bazaar* marked a revolutionary break with the equipoise of traditional fashion photography, and Avedon joined the revolt with a fervor that lasted a lifetime.

Dovima with Elephants was one in a series of pictures Avedon began making in Paris in 1947, the year of Christian Dior's "new look," when the City of Lights was again shining as the center of the fashion world. With a rookie's zeal, Avedon took his models into the streets to create cinematic scenes. Gathering in the frame of his Rolleiflex street performers, weight lifters, laborers and a young couple on roller skates, he gave fashion a demotic energy it never had before. I have been to more than a few Avedon fashion shoots, where his irrepressible enthusiasm infected everyone in the studio, from jaded hairstylists to blasé supermodels. In his Parisian pictures from the late 1940s and '50s, the *joie de vivre* is the expression of a young man's delight at being where he was, doing what he was doing.

Brodovitch told his photographers, "If you look through your camera and see an image you've seen before, don't click the shutter." With pages to fill month after month, this was an impossible demand. But when Avedon took Dovima to the Cirque d'Hiver on a hot August day, put her in a Dior evening dress, arranged its white silk sash to catch the natural light and stood her in front of a row of restive elephants—an imperturbable goddess calming the fearsome creatures by the laying on of perfectly manicured hands—he came back with a truly original picture that still reverberates with the power of myth.

OWEN EDWARDS is a former exhibitions critic for American Photographer.

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OH DEER!

CONTRACEPTION SHOWS PROMISE, BUT OTHER MEASURES MAY BE NEEDED TO LESSEN THE TOLL THAT THE DEER BOOM IS HAVING ON FORESTS AND SUBURBS **BY ANNE BROACHE**

Will birth control drugs (near Front Royal, Virginia, researchers release a treated doe) really curb deer overpopulation?

"PUT YOUR CHEST on the deer. Reach out and hold the legs. Never let go of the hooves."

Bill McShea, a wildlife biologist at the National Zoo in Washington, D.C., is instructing a handful of assistants in the art of subduing a wild white-tailed deer. The researchers are in Virginia's Blue Ridge Mountains on a warm morning, the mowed grass along the boundary of the woods still gleaming with dew. The night before, the group had sprinkled a trail of alfalfa pellets into five deer traps, wooden boxes about five feet tall with doors that fall shut when a deer steps inside and trips a string. This animal went for the bait.

"It's a feisty one," an assistant says, listening to the thumping hooves.

McShea and co-workers guide the deer through a door in the trap into a smaller box, then pull the squirming nearly 100-pound animal out by its hind legs. Two people pin it to the ground, and each grabs a set of kicking legs. Another helper covers its eyes with a dark towel. "That'll take 90 percent of the fight out of the deer," says McShea. The animal is female, so McShea reaches for a syringe and injects her in the rump.

The syringe contains an experimental contraceptive drug. McShea and others are testing, first, whether it will reliably block a doe's reproductive cycle for life and, second, whether birth control drugs could possibly make a dent in America's deer population boom. When it comes to controlling deer populations, McShea says, "You want to have as many tools as possible."

Once overhunted, white-tailed deer have returned in such explosive numbers that they're ravaging forestland and besieging rural and even suburban communities. The animals cause car accidents, carry ticks that can transmit infectious diseases to people, chew up landscaping and otherwise make pests of themselves, albeit sometimes strikingly graceful ones.

Deer numbers are rising in part because their traditional predators, including mountain lions and gray wolves, were eliminated from most Eastern forests long ago. Also, white-tailed deer reproduce quickly—a female bears one to three fawns each year—and they're one of the more adaptable species around, living from subarctic to tropical climates. Past restrictions on deer hunting have also fueled the boom.

But deer are also thriving because of the ways people have carved up the countryside, unwittingly creating prime deer habitat. Deer, says McShea, are an "edge species," meaning they thrive where forests meet fields. They seek shelter in forests, but most forest food is too high for them to reach. Edges abound in plants deer can munch. "Originally, the eastern United States was one deep, dark forest," McShea says. "Now it's deer nirvana. It's one big edge."

In some parts of highly suburbanized New Jersey, up to 60 deer live in a square mile, according to the state's Division of Fish and Wildlife, compared with just 5 to 10 deer per square mile before the land was settled by Europeans.

With so many deer at large, interactions are common. Nationwide, cars hit

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at least 1.5 million deer a year, the Insurance Institute for Highway Safety reports, causing more than a billion dollars in vehicle damage. In 2003, collisions with animals killed 210 people, and three-quarters of the encounters involved deer. Deer transport ticks that carry Lyme disease; more than 21,000 cases were reported in 2003.

At the same time, scientists have more and more evidence that an overabundance of deer takes a surprising toll not only on suburban pansies and azaleas but also on wild forestlands. From the Rocky Mountains to the Midwest and up and down the East Coast, whitetailed deer are vacuuming up acorns, herbs, flowering plants, woody shrubs and short saplings that make up the forest's "understory," plants from ground level up to about six feet. West Virginia University ecologists have reported that deer are a major threat to American ginseng, an increasingly rare herb.

Deer browsing transforms forest ecology. Harder to find are yellow spicebush blossoms (and the spicebush swallowtail butterflies that feed on them), highbush blueberries and white trillium. Invasive Japanese knotweed, multiflora rose and garlic mustard outnumber once common native orchids and ferns. Thrushes, warblers and other shrub- and ground-nesters have taken flight in search of choicer areas. Chipmunks, frogs and snakes are rarer because they have little to eat—as do the hawks and owls that prey on them. What's left is a "ghost forest," says Eric Stiles, the New Jersey Audubon Society's vice president for conservation and stewardship.

Stiles says that in the past 30 years the group's Scherman-Hoffman Wildlife Sanctuary, in the north-central part of the state, has lost dozens of species of plants and well over a dozen species of birds that nest on the ground or in shrubs because of the burgeoning deer population. For the first time in its 108-year history, the conservation organization recommended hunting in its sanctuaries as a wildlife-management strategy. But in many areas, including almost all suburbs, shooting deer is both unpopular and illegal. Which is why deer contraception may be an idea whose time has come.

For the first time in its history, the conservation organization has recommended deer hunting in its wildlife sanctuaries.

Cars colliding with deer (a Philadelphia sign) kill more than 100 people a year.

That day in the Virginia forest, biologist McShea measures the doe's length (67 inches, from the tip of her tail to her nose) and girth (27 1/2 inches) and attaches a numbered tag to each ear. An assistant uses a portable ultrasound device, which looks like a computer monitor, to measure the fat on the deer's rump, an indicator of health.

"One, two, three," McShea says. "Go!" They release the animal. "That's the only dicey part. Whoever lets go last is going to get kicked." Researchers have gotten black eyes, bruises, gashes worthy of stitches, but no one is hurt this time. The doe prances off into the woods.

At the 3,200-acre campus of the National Zoo's Conservation and Research Center near Front Royal, Virginia, McShea has been overseeing a study of immunocontraception, or using a vaccine to prompt the animal's immune system to prevent conception. Thirteen years ago, McShea tested a drug called porcine zona pellucida, which comes from pig eggs and is known as PZP. He found that the drug prevented pregnancy, but only for one season. Since 2003 he has been testing a Canadian PZP-derived drug called SpayVac, which costs $110 per dose but may last a deer's lifetime.

Unlike human hormone-based contraceptives, which prevent ovaries from releasing an egg, PZP causes a female deer to produce antibodies that stick to the egg's surface. The antibodies block sperm from fertilizing the egg. The drug has to be given directly into the bloodstream, largely because researchers have yet to develop an oral version that can survive a trip through a deer's digestive system. The U.S. Food and Drug Administration still considers the drug "experimental." The manufacturer prohibits women, such as McShea's female co-workers, from handling the contraceptive—nobody knows if it could sterilize them too.

The drugs aren't perfect. McShea's team has injected 38 deer with SpayVac. None had fawns in the first year after treatment. But at least two treated does gave birth the second season.

Not even reliable contraceptives can, by themselves, solve the problem, McShea says. Before the SpayVac tests began in 2003, he had 232 deer culled from his 850-acre experimental area, leaving about 50 deer behind. Now the population in that area is growing, despite contraceptives, because new deer are immigrating to the property. He says widespread hunting will be needed to reduce deer populations to a sustainable level.

McShea says he's "guardedly optimistic" that, eventually, improved immunocontraceptives will help control deer overpopulation. Until people learn to manage the deer numbers, McShea says, his advice is to "drive slower."

ANNE BROACHE, a former SMITHSONIAN *intern, is a reporter for CNET News.com.*

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VYTORIN treats the 2 sources of cholesterol.

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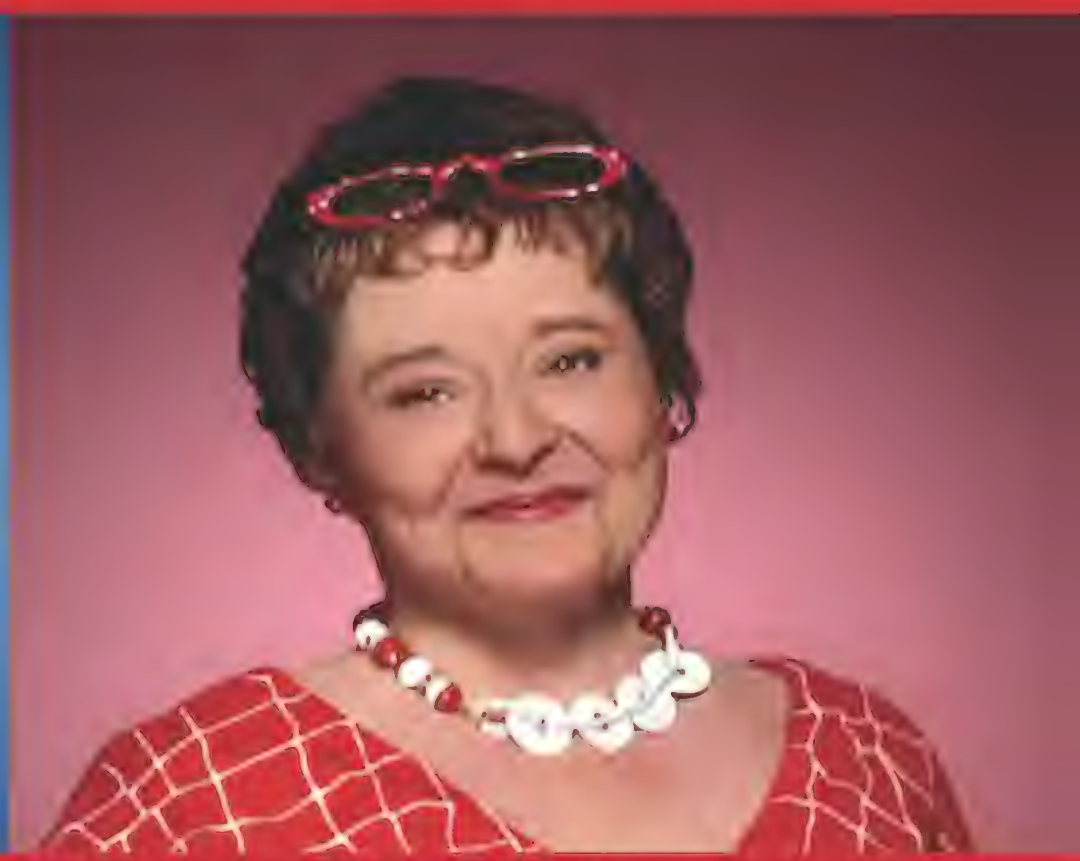

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Important information: VYTORIN is a prescription tablet and isn't right for everyone, including women who are nursing or pregnant or who may become pregnant, and anyone with liver problems. Unexplained muscle pain or weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. VYTORIN may interact with other medicines or certain foods, increasing your risk of getting this serious side effect. So, tell your doctor about any other medications you are taking.

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Generic name: ezetimibe/simvastatin tablets

Read this information carefully before you start taking VYTORIN. Review this information each time you refill your prescription for VYTORIN as there may be new information. This information does not take the place of talking with your doctor about your medical condition or your treatment. If you have any questions about VYTORIN, ask your doctor. Only your doctor can determine if VYTORIN is right for you.

What is VYTORIN?

VYTORIN is a medicine used to lower levels of total cholesterol, LDL (bad) cholesterol, and fatty substances called triglycerides in the blood. In addition, VYTORIN raises levels of HDL (good) cholesterol. It is used for patients who cannot control their cholesterol levels by diet alone. You should stay on a cholesterol-lowering diet while taking this medicine.

VYTORIN works to reduce your cholesterol in two ways. It reduces the cholesterol absorbed in your digestive tract, as well as the cholesterol your body makes by itself. VYTORIN does not help you lose weight.

Who should not take VYTORIN?

Do not take VYTORIN:

- If you are allergic to ezetimibe or simvastatin, the active ingredients in VYTORIN, or to the inactive ingredients. For a list of inactive ingredients, see the "Inactive ingredients" section at the end of this information sheet.
- If you have active liver disease or repeated blood tests indicating possible liver problems.
- If you are pregnant, or think you may be pregnant, or planning to become pregnant or breast-feeding.

VYTORIN is not recommended for use in children under 10 years of age.

What should I tell my doctor before and while taking VYTORIN?

Tell your doctor right away if you experience unexplained muscle pain, tenderness, or weakness. This is because on rare occasions, muscle problems can be serious, including muscle break-down resulting in kidney damage.

The risk of muscle breakdown is greater at higher doses of VYTORIN.

The risk of muscle breakdown is greater in patients with kidney problems.

Taking VYTORIN with certain substances can increase the risk of muscle problems. It is particularly important to tell your doctor if you are taking any of the following:

- cyclosporine
- danazol
- antifungal agents (such as itraconazole or ketoconazole)
- fibric acid derivatives (such as gemfibrozil, bezafibrate, or fenofibrate)
- the antibiotics erythromycin, clarithromycin, and telithromycin
- HIV protease inhibitors (such as indinavir, nelfinavir, ritonavir, and saquinavir)
- the antidepressant nefazodone
- amiodarone (a drug used to treat an irregular heartbeat)
- verapamil (a drug used to treat high blood pressure, chest pain associated with heart disease, or other heart conditions)
- large doses (≥1 g/day) of niacin or nicotinic acid
- large quantities of grapefruit juice (>1 quart daily)

It is also important to tell your doctor if you are taking coumarin anticoagulants (drugs that prevent blood clots, such as warfarin).

Tell your doctor about any prescription and nonprescription medicines you are taking or plan to take, including natural or herbal remedies.

Tell your doctor about all your medical conditions including allergies.

Tell your doctor if you:

- drink substantial quantities of alcohol or ever had liver problems. VYTORIN may not be right for you.
- are pregnant or plan to become pregnant. Do not use VYTORIN if you are pregnant, trying to become pregnant or suspect that you are pregnant. If you become pregnant while taking VYTORIN, stop taking it and contact your doctor immediately.
- are breast-feeding. Do not use VYTORIN if you are breast-feeding.

Tell other doctors prescribing a new medication that you are taking VYTORIN.

How should I take VYTORIN?

- Take VYTORIN once a day, in the evening, with or without food.
- Try to take VYTORIN as prescribed. If you miss a dose, do not take an extra dose. Just resume your usual schedule.
- Continue to follow a cholesterol-lowering diet while taking VYTORIN. Ask your doctor if you need diet information.
- Keep taking VYTORIN unless your doctor tells you to stop. If you stop taking VYTORIN, your cholesterol may rise again.

What should I do in case of an overdose?

Contact your doctor immediately.

What are the possible side effects of VYTORIN?

See your doctor regularly to check your cholesterol level and to check for side effects. Your doctor may do blood tests to check your liver before you start taking VYTORIN and during treatment.

In clinical studies patients reported the following common side effects while taking VYTORIN: headache and muscle pain (see What should I tell my doctor before and while taking VYTORIN?).

The following side effects have been reported in general use with either ezetimibe or simvastatin tablets (tablets that contain the active ingredients of VYTORIN):

- allergic reactions including swelling of the face, lips, tongue, and/or throat that may cause difficulty in breathing or swallowing (which may require treatment right away), and rash; alterations in some laboratory blood tests; liver problems; inflammation of the pancreas; nausea; gallstones; inflammation of the gallbladder.

Tell your doctor if you are having these or any other medical problems while on VYTORIN. This is <u>not</u> a complete list of side effects. For a complete list, ask your doctor or pharmacist.

General Information about VYTORIN

Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use VYTORIN for a condition for which it was not prescribed. Do not give VYTORIN to other people, even if they have the same condition you have. It may harm them.

This summarizes the most important information about VYTORIN. If you would like more information, talk with your doctor. You can ask your pharmacist or doctor for information about VYTORIN that is written for health professionals. For additional information, visit the following web site: vytorin.com.

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Butylated hydroxyanisole NF, citric acid monohydrate USP, croscarmellose sodium NF, hydroxypropyl methyl-cellulose USP, lactose monohydrate NF, magnesium stearate NF, microcrystalline cellulose NF, and propyl gallate NF.

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BROAD SHOULDERS

WHEN UNION LEADER CESAR CHAVEZ ORGANIZED THE NATION'S FARMWORKERS, HE LAUNCHED A MOVEMENT THAT CHANGED HISTORY **BY OWEN EDWARDS**

Cesar Chavez's union jacket, c. 1990
NATIONAL MUSEUM OF AMERICAN HISTORY

RICHARD W. STRAUSS / NATIONAL MUSEUM OF AMERICAN HISTORY, SMITHSONIAN INSTITUTION

ANYONE WHO HAS EVER bought secondhand clothing—an activity these days for the chic as well as the shabby—knows that in a well-worn cashmere sweater or double-breasted tuxedo there remains some echo of the original owner's life and times, however faint. Like old houses, lived-in clothing has a story to tell.

This feeling of connectedness can be especially potent with clothing that belonged to someone well known. The ruby slippers worn by Judy Garland as Dorothy and Jackie Kennedy's inaugural gown have, by now, taken on near mythic magnetism. Not only do we associate these things with an individual but also with a time in our lives, and a time in the nation's history. So when Harry Rubenstein, a curator at the National Museum of American History, asked the family of Cesar Chavez a few months after the union leader's death at age 66 on April 23, 1993, for some memento for the museum,

he was delighted to receive Chavez's union jacket. It is made of black nylon satin, with the eagle emblem of the United Farm Workers to the left of the zipper and "Cesar Chavez" embroidered to the right.

"The jacket makes a simple statement," Rubenstein says. "It's uniform-like, but it's not fancy—very American in style."

In the case of Chavez, simple makes sense. He was not to the mannerism born. Called "one of the heroic figures of our time" by Robert Kennedy, Chavez was a first-generation American whose Mexican-born parents lost their Arizona farm in 1937, during the Great Depression, when he was 10. The family became migrant workers. The National Labor Relations Act of 1935 excluded agricultural workers in its rights and protections, so migrants' working conditions ranged from reasonable to deplorable, depending on an employer's attitude . . . or whim. In 1962, Chavez, by then a Navy veteran, left his job with the Community Service Organization, a Latino civil rights group and, inspired by the principles of Mahatma Gandhi and Martin Luther King Jr., founded the National Farm Workers Association (later to become the United Farm Workers).

The annealing moment for the young union and its leader came in September 1965, when Chavez joined a strike against grape growers in Delano, California, that had been started a few weeks before by Filipino field workers. The strike lasted for five years and led to a nationwide boycott of table grapes. By the time it ended, Chavez was widely known and almost as widely admired. "La causa" had galvanized the movement and attracted people who had never before thought about how their supermarket produce was grown and picked. "I had done a lot of reading about farm labor unions, thought about them, and questioned every farm worker I could find who had been involved in a strike," Chavez told his biographer Jacques E. Levy in the early 1970s. "It was a sad history of defeat after defeat. . . . But the more I studied the mistakes that were made in the past, the more I believed growers were not invincible. If we fought them right, we could beat them. . . . I felt a union could succeed."

"Growers were not invincible. If we fought them right, we could beat them."

Chavez (center, marching with Coretta Scott King in New York City, 1973) believed in the power of peaceful protest: "We can turn the world if we can do it nonviolently."

By the early 1970s, a public opinion poll found that 17 million Americans were refusing to buy table grapes. In the tumultuous year of 1968, some 5,000 people marched through the streets of San Francisco shouting, "*Viva la huelga* [strike], *viva Chavez*." (Many years later, Army Street, a major road in San Francisco, was renamed Cesar Chavez Street.)

Chavez had a deep understanding of the power of public, nonviolent protest. He fasted three times—twice for 25 days and once, in 1988, for 36 days—to draw attention to poor working conditions and the danger pesticides posed for farmworkers and their families. In the spring of 1966, he led a 340-mile march from Delano to the steps of the State Capitol in Sacramento, which occasioned the signing of the first union contract between growers and farmworkers in U.S. history. In June 1975, California governor Jerry Brown signed a state law that guaranteed farmworkers the right to collective bargaining.

Chavez's jacket was one of several made for officers and high-ranking members of the union. It has come to represent the solidarity of some of this country's poorest, least powerful workers who stood together to demand better conditions. It also stands, of course, for a charismatic man who became a symbol of resistance and renascence for those workers. It has been part of several museum exhibitions since its acquisition, including "America's Smithsonian: Celebrating 150 Years" in 1996.

Harry Rubenstein remembers approaching the Chavez family shortly after Cesar died. "One of my responsibilities at the time," he says, "was to serve as curator of American labor, so I had a background in much of what Chavez stood for. But I made the request with the greatest care, and certainly didn't take this gift lightly."

Which is as it should be, since the story this simple garment has to tell is nothing less than an American epic.

OWEN EDWARDS also wrote this month's Indelible Images piece on Richard Avedon.

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DIVE BOMBER

UNDERWATER ARCHAEOLOGISTS READY A CRASHED B-29 FOR VISITS BY SCUBA-WEARING TOURISTS AT THE BOTTOM OF LAKE MEAD **BY JULIAN SMITH**

ON A BARGE IN LAKE MEAD, in Nevada, under a scorching sun, Dave Conlin pulled on long underwear, wool socks and a fleece jacket and pants. He donned an insulated drysuit over all that, strapped two scuba tanks to his back and slung another under one arm. It was so much gear—weighing nearly 200 pounds—that he needed help standing up. His boyish face compressed in a thick neoprene dive hood, Conlin duck-walked to the edge of the barge and stepped into the water.

Plunging in after Conlin, who is an underwater archaeologist with the National Park Service's Submerged Resources Center (SRC), were fellow archaeologist Matt Russell and photographer Brett Seymour, both with the SRC, and Jeff Bozanic, a technical diver under contract to the National Park Service. Bobbing at the surface, the four double-checked their gear and descended into the darkness in a trail of bubbles.

One hundred seventy feet below lay the wreckage of a B-29 bomber. It crashed in 1948 while on a top-secret mission to test components for a missile-guidance system. After World War II, this B-29, known by its serial number, 45-21847, had been stripped of its armaments and fitted with a Sun Tracker, an experimental sensor unit that, when perfected, would allow missiles to navigate by the sun. The cold war was heating up, and the U.S. military wanted missiles that could not be jammed from the ground, as the radar- and radio-guided missiles of the time could be. The Sun Tracker was a precursor to the systems that guide today's cruise missiles.

On July 21, 1948, the bomber took off from Inyokern, California, with a crew of five and climbed to 30,000 feet over the desert, where civilian scientist John Simeroth took measurements of solar radiation to calibrate the Sun Tracker. The plane was making a low pass over the dead-calm surface of Lake Mead when it struck the water at 230 miles per hour, ripping off three engines and setting fire to the fourth. (Pilot error was later found to be the cause.) The plane skipped like a stone, but the pilot, Capt. Robert Madison, put it down safely. The crew escaped into life rafts and were rescued later that day; the worst injury was Sgt. Frank Rico's broken arm.

In 2001, a private dive team searching for the B-29 using sidescan sonar found the wreck in the northern arm of Lake Mead. Because the bomber lies inside a National Recreation Area, responsibility for the site fell to the National Park Service. The SRC has been surveying the site and preparing it for amateur divers willing to brave the frigid depths for a glimpse of a cold war relic.

As Conlin later described it, a quick descent took them to the plane, which rests right side up, its nose cowling crushed and its back broken, but otherwise in remarkably good condition. Its aluminum skin, lit by powerful dive lights suspended from the barge, shone faintly in the greenish murk. Rectangular holes in the tail show where the fabric coverings were torn away.

Soon to be a park attraction? The B-29 that went down in Lake Mead was secretly testing a part for a missile-guidance system.

STANFELLOWS.COM

The research team sets to work, with Seymour shooting video of Russell to use in an orientation film for visiting divers. Bozanic and Conlin attached tape measures to the plane, from wingtip to wingtip and from the top of the fuselage to where it disappeared into the muddy lake bottom. The operators of a small ROV (Remotely Operated Vehicle) fitted with an electrochemical probe and a video feed will use the measuring tapes as a reference as they

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"The plane looms out of the gloom," says Bozanic. "It's scary."

Conlin (right) prepares for frigid water.

guide the ROV around the wreck. They will take readings every foot to measure how much the bomber's surface is corroding in the water.

From one of the bomber's engine enclosures hangs another probe, installed on an earlier dive, that collects data every five minutes, including temperature, salinity and the amount of dissolved oxygen in the water. "This all tells us something about the corrosive environment," says Russell. The team is also documenting the plane's current condition. "We're establishing a base line so that we can come back in two, five or ten years and see what the visitor impact has been."

The Lake Mead bomber is believed to be the only submerged B-29 in the continental United States, and the park service predicts it'll become a popular dive site. SRC divers have already mapped the B-29 and also installed mooring buoys nearby to keep dive boats from dropping anchors onto the bomber. Cables run from the buoys to a weight next to the plane to guide divers through the dark water.

"It will be a once-in-a-lifetime dive," says Bill Gornet, owner of Dive Las Vegas. "You really don't know how big a B-29 is until you're on top of one—it's monstrous." With a wingspan of 141 feet and a tail that stands 29 feet high, the B-29 was the heaviest, most advanced bomber of its time. The Lake Mead plane, with its guns and armor removed, closely resembled a more famous pair of bombers that were stripped down for speed: the *Enola Gay* and the *Bockscar*, which dropped atomic bombs on Hiroshima and Nagasaki, respectively. Fewer than a dozen B-29s are on display at museums and air parks around the country, including the *Enola Gay* at the Smithsonian Institution's Steven F. Udvar-Hazy Center near Washington Dulles International Airport and the *Bockscar* at the United States Air Force Museum at Wright-Patterson Air Force Base in Ohio.

Although diving on a WWII bomber is a far cry from dusting off 1,000-year-old clay pots, it's still archaeology. Few scholars combine technical diving skills with the archaeological experience of the SRC. Based in Santa Fe, New Mexico, the squad's five experts dive on locations around the world. If an artifact is underwater and in a national park, the SRC usually gets the call. They've had a hand in raising a sunken Civil War submarine, and now, says the squad's chief, Larry Murphy, the group is surveying the USS *Arizona* in Pearl Harbor and a sunken ferry off New York's Ellis Island. "The first question is what's there, and the second question is what's happening to it."

At a depth of 170 feet, archaeologists have just 30 minutes to study the plane.

Conlin, 40, says he has wanted to be an underwater archaeologist since childhood, when he watched Jacques Cousteau films and National Geographic documentaries about Mediterranean shipwrecks. "Growing up in Colorado, I didn't even see the ocean until I was 6," he says, "but I've known I wanted to be down there finding amazing stuff for a long time."

Deep underwater, time is precious, and there's little room for error. Below 130 feet, SRC divers breathe special air mixes of helium and oxygen, and must abide carefully by timetables telling how long they can safely stay at a given depth—to the minute—or they risk decompression sickness (the bends). The B-29 archaeologists can spend only two hours underwater, and they must use three-quarters of that time returning to the surface in stages. That leaves only half an hour on the bottom. And every fourth day is a rest day, giving each archaeologist at most only three hours of hands-on time a week.

Two hours after Conlin and co-workers jumped into the lake, they surface, right on schedule. Conlin is shivering—some of the 48-degree Fahrenheit water seeped through the neck of his suit—but otherwise everything went perfectly. That night, barefoot on a houseboat tucked into a secluded cove, the divers revise the detailed drawings of the plane they made in 2003, go over the day's photos and video, and plan the next day's dive.

"The first time you go down it's spooky," says Bozanic, who has decades of diving experience in caves around the world. "The deeper you go, the darker and colder it gets. Everything is covered in silt, there's no point of reference. Then the plane looms out of the gloom. It's downright scary."

SRC divers work for the thrill of discovery and the chance to challenge themselves in one of the planet's most unforgiving environments. "Your focus," Russell says, "is split between archaeology and staying alive."

JULIAN SMITH is a travel and science writer based in Santa Fe, New Mexico.

JULIAN SMITH; BRETT SEYMOUR / NATIONAL PARK SERVICE

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What is the most important information I should know about BONIVA?
BONIVA may cause serious problems in the stomach and the esophagus (the tube that connects your mouth and stomach) such as trouble swallowing, heartburn, and ulcers (see **"What are the possible side effects of BONIVA?"**).

You must take BONIVA exactly as prescribed for BONIVA to work for you and to lower the chance of serious side effects (see **"How should I take BONIVA?").**

What is BONIVA?
BONIVA is a prescription medicine used to treat or prevent osteoporosis in women after menopause (see **"What is osteoporosis?"**).
BONIVA may reverse bone loss by stopping more loss of bone and increasing bone mass in most women who take it, even though they won't be able to see or feel a difference. BONIVA may help lower the chances of breaking bones (fractures).
For BONIVA to treat or prevent osteoporosis, you have to take it as prescribed. BONIVA will not work if you stop taking it.

Who should not take BONIVA?
Do not take BONIVA if you:
- have low blood calcium (hypocalcemia)
- cannot sit or stand up for at least 1 hour (60 minutes)
- have kidneys that work very poorly
- are allergic to ibandronate sodium or any of the other ingredients of BONIVA (see the end of this page for a list of all the ingredients in BONIVA)

Tell your health care provider before using BONIVA:
- if you are pregnant or planning to become pregnant. It is not known if BONIVA can harm your unborn baby.
- if you are breast-feeding. It is not known if BONIVA passes into your milk and if it can harm your baby.
- have swallowing problems or other problems with your esophagus (the tube that connects your mouth and stomach)
- if you have kidney problems
- **about all the medicines you take** including prescription and non-prescription medicines, vitamins and supplements. Some medicines, especially certain vitamins, supplements, and antacids can stop BONIVA from getting to your bones. This can happen if you take other medicines too close to the time that you take BONIVA (see **"How should I take BONIVA?"**).

How should I take BONIVA?
- Take BONIVA exactly as instructed by your health care provider.
- Take BONIVA first thing in the morning at least 1 hour (60 minutes) before you eat, drink anything other than plain water, or take any other oral medicine.
- Take BONIVA with 6 to 8 ounces (about 1 full cup) of plain water. Do not take it with any other drink besides plain water. Do not take it with other drinks, such as mineral water, sparkling water, coffee, tea, dairy drinks (such as milk), or juice.
- Swallow BONIVA whole. Do not chew or suck the tablet or keep it in your mouth to melt or dissolve.
- After taking BONIVA you must wait at least 1 hour (60 minutes) before:
  - -Lying down. You may sit, stand, or do normal activities like read the newspaper or take a walk.
  - -Eating or drinking anything except for plain water.
  - -Taking other oral medicines including vitamins, calcium, or antacids. Take your vitamins, calcium, and antacids at a different time of the day from the time when you take BONIVA.
- If you take too much BONIVA, drink a full glass of milk and call your local poison control center or emergency room right away. Do not make yourself vomit. Do not lie down.
- Keep taking BONIVA for as long as your health care provider tells you. BONIVA will not work if you stop taking it.
- Your health care provider may tell you to exercise and take calcium and vitamin supplements to help your osteoporosis.
- Your health care provider may do a test to measure the thickness (density) of your bones or do other tests to check your progress.

What is my BONIVA schedule?
Schedule for taking BONIVA 150 mg once monthly:
- Take one BONIVA 150-mg tablet once a month.
- Choose one date of the month (your BONIVA day) that you will remember and that best fits your schedule to take your BONIVA 150-mg tablet.
- Take one BONIVA 150-mg tablet in the morning of your chosen day (see **"How should I take BONIVA?"**).

What to do if I miss a monthly dose:
- If your next scheduled BONIVA day is more than 7 days away, take one BONIVA 150-mg tablet in the morning following the day that you remember (see **"How should I take BONIVA?"**). Then return to taking one BONIVA 150-mg tablet every month in the morning of your chosen day, according to your original schedule.
- **Do not** take two 150-mg tablets within the same week. If your next scheduled BONIVA day is only 1 to 7 days away, **wait** until your next scheduled BONIVA day to take your tablet. Then return to taking one BONIVA 150-mg tablet every month in the morning of your chosen day, according to your original schedule.
- **If you are not sure what to do if you miss a dose, contact your health care provider who will be able to advise you.**

Schedule for taking BONIVA 2.5 mg once daily:
- Take one BONIVA 2.5-mg tablet once a day first thing in the morning at least 1 hour (60 minutes) before you eat, drink anything other than plain water, or take any other oral medicine (see **"How should I take BONIVA?"**).

What to do if I miss a daily dose:
- If you forget to take your BONIVA 2.5-mg tablet in the morning, **do not** take it later in the day. Just return to your normal schedule and take 1 tablet the next morning. **Do not** take two tablets on the same day.
- **If you are not sure what to do if you miss a dose, contact your health care provider who will be able to advise you.**

What should I avoid while taking BONIVA?
- Do not take other medicines, or eat or drink anything but plain water before you take BONIVA and for at least 1 hour (60 minutes) after you take it.
- Do not lie down for at least 1 hour (60 minutes) after you take BONIVA.

What are the possible side effects of BONIVA?
Stop taking BONIVA and call your health care provider right away if you have:
- **pain or trouble with swallowing**
- **chest pain**
- **very bad heartburn or heartburn that does not get better**

BONIVA MAY CAUSE:
- pain or trouble swallowing (dysphagia)
- heartburn (esophagitis)
- ulcers in your stomach or esophagus (the tube that connects your mouth and stomach)

Common side effects with BONIVA are:
- diarrhea
- pain in extremities (arms or legs)
- dyspepsia (upset stomach)

Less common side effects with BONIVA are short-lasting, mild flu-like symptoms (usually improve after the first dose). These are not all the possible side effects of BONIVA. For more information ask your health care provider or pharmacist.

Rarely, patients have reported severe bone, joint, and/or muscle pain starting within one day to several months after beginning to take, by mouth, bisphosphonate drugs to treat osteoporosis (thin bones). This group of drugs includes BONIVA. Most patients experienced relief after stopping the drug. Contact your health care provider if you develop these symptoms after starting BONIVA.

What is osteoporosis?
Osteoporosis is a disease that causes bones to become thinner. Thin bones can break easily. Most people think of their bones as being solid like a rock. Actually, bone is living tissue, just like other parts of the body, such as your heart, brain, or skin. Bone just happens to be a harder type of tissue. Bone is always changing. Your body keeps your bones strong and healthy by replacing old bone with new bone.

Osteoporosis causes the body to remove more bone than it replaces. This means that bones get weaker. Weak bones are more likely to break. Osteoporosis is a bone disease that is quite common in women after menopause. At first, osteoporosis has no symptoms, but people with osteoporosis may develop loss of height and are more likely to break (fracture) their bones, especially the back (spine), wrist, and hip bones.

Osteoporosis can be prevented, and with proper therapy it can be treated.

Who is at risk for osteoporosis?
Talk to your health care provider about your chances for getting osteoporosis.

Many things put people at risk for osteoporosis. The following people have a higher chance of getting osteoporosis:

Women who:
- are going through or who are past menopause ("the change")
- are white (Caucasian) or Oriental (Asian)

People who:
- are thin
- have a family member with osteoporosis
- do not get enough calcium or vitamin D
- do not exercise
- smoke
- drink alcohol often
- take bone thinning medicines (like prednisone) for a long time

General information about BONIVA
Medicines are sometimes prescribed for conditions that are not mentioned in patient information. Do not use BONIVA for a condition for which it was not prescribed. Do not give BONIVA to other people, even if they have the same symptoms you have. It may harm them.

Store BONIVA at 77°F (25°C) or at room temperature between 59°F and 86°F (15°C and 30°C).

Keep BONIVA and all medicines out of the reach of children.

This summarizes the most important information about BONIVA. If you would like more information, talk with your health care provider. You can ask your health care provider or pharmacist for information about BONIVA that is written for health professionals.

For more information about BONIVA, call 1-888-MY-BONIVA or visit www.myboniva.com.

What are the ingredients of BONIVA?
BONIVA (active ingredient): ibandronate sodium
BONIVA (inactive ingredients): lactose monohydrate, povidone, microcrystalline cellulose, crospovidone, purified stearic acid, colloidal silicon dioxide, and purified water. The tablet film coating contains hypromellose, titanium dioxide, talc, polyethylene glycol 6000 and purified water.

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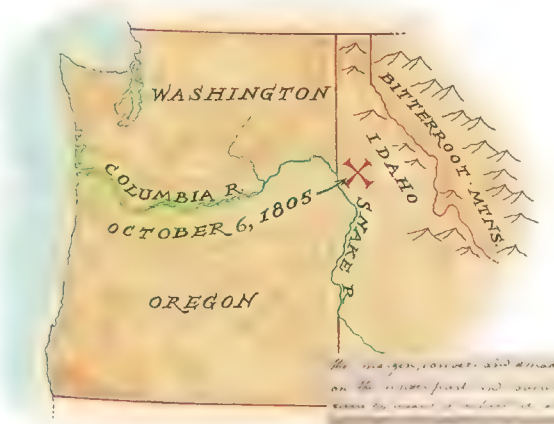
PUSH TO THE PACIFIC

GUIDED BY THE NEZ PERCÉ, THE MEN AND WOMEN OF THE CORPS REACH THE COLUMBIA AMID THREATS TO THEIR LIVES

After a difficult crossing over the Bitterroot Mountains (the northern Rockies), the corps set up camp and began work on canoes to journey down the Snake River to the Columbia. (They lent their horses to the Nez Percé Indians.) From existing maps, the captains knew that the Columbia would take them all the way to the Pacific Ocean. The river had been charted from the west some 13 years earlier by Robert Gray, an American sea captain, who had named the waterway after his vessel.



October 6, 1805
[Capt. William Clark]
All the Canoes finished this evening ready to be put into the water.

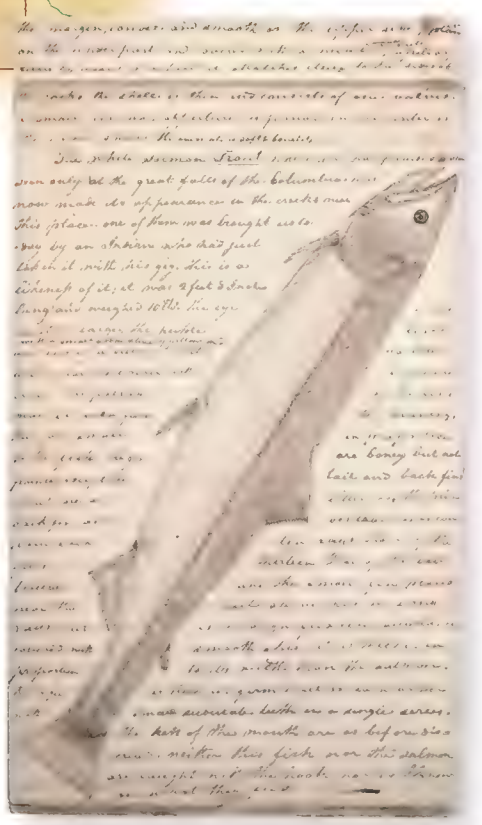
October 8 [Sgt. Patrick Gass]
A 9 o'clock in a fine morning we continued our voyage down the river; passed three islands and several rapids; and at noon stopped at some Indian lodges, of which there are a great many along the river. At 2 we proceeded on again. In the evening, in passing through a rapid, I had my canoe stove, and she sunk. Fortunately the water was not more than waist deep, so our lives and baggage were saved, though the latter was wet. . . . Two chiefs of the upper village joined us here, and proposed to go on with us, until we should meet with white people; which they say will be at no great distance.

October 10 [Clark]
Our diet extremely bad haveing nothing but roots and dried fish to eate, all the Party have greatly the advantage of me, in as much as they all relish the flesh of the dogs, Several of which we purchased of the nativs for to add to our Store of fish and roots.

October 13 [Clark]
[Sacagawea,] the wife of Shabono our interpetr we find reconsiles all the Indians, as to our friendly intentions a woman with a party of men is a token of peace.

October 16 [Clark]
After getting Safely over the rapid and haveing taken Diner Set out and proceeded on Seven miles to the junction of this river and the Columbia which joins from the N.W.

October 17 [Clark]
This river is remarkably Clear and Crouded with Salmon in maney places, I observe in assending great numbers of Salmon *dead* on the Shores, floating on the water and in the Bottoms which can be seen at the debth of 20 feet. the Cause of the emence numbers of dead Salmon I can't account for So it is I must have seen 3 or 400 dead and maney living.



Sergeant Gass: "Salmon are very plenty but poor and dying, and therefore not fit for provisions."

October 23 [Gass]
The country on both sides of the river here is high, and the bluffs rocky. . . . The high water mark below the falls is 48 feet, and above only 10 feet four inches from the surface of the water: so that in high water there is nothing but a rapid, and the salmon can pass up without difficulty.

October 23 [Clark]
Great numbers of Indians visit us both from above and below [the falls]. one of the old Chiefs who had accompanied us from the head of the river, informed us that he herd the Indians Say that the nation below intended to kill us, we examined all the arms &c. complete the amunition to 100 rounds. The nativs leave us earlyer this evening than usial, which gives a Shadow of Confirmation to the information of our Old Chief. . . . our two old Chiefs appeared verry uneasy this evening.

October 24 [Clark]
Our 2 old Chiefs deturmin to return home, Saying they were at war with Indians below and they would kill them.

MIKE REAGAN; AMERICAN PHILOSOPHICAL SOCIETY

THEY SHOOT ICEBERGS, DON'T THEY?

Chas Bishop takes aim at a drifting mass of frozen fresh water just off the northeastern coast of Newfoundland. Between May and August, several hunters like Bishop shoot weak sections of the frosty hunks into smaller one- to two-ton pieces, called "growlers," then use nets to hoist them onto boats for processing into bottled drinking water and as an ingredient in a brand of vodka made in Newfoundland. Water from icebergs, frozen thousands of years ago and free of modern pollutants, is "the purest water in the world," says David Sacks, president of the Canadian Iceberg Vodka Corporation, a distiller. In 2005, Sacks expects to harvest some 3,000 tons of ice. Photograph by Grégoire Maisonneuve / SIPA.

—HELEN STARKWEATHER

Schwartz (with replica of a 1785 life mask) has tried to picture the first president (the Stuart portrait) as a lad.

CATHERINE J. JUN / ARIZONA REPUBLIC; DETAIL: GILBERT STUART, "GEORGE WASHINGTON" NATIONAL PORTRAIT GALLERY, SMITHSONIAN INSTITUTION / ART RESOURCE, NEW YORK

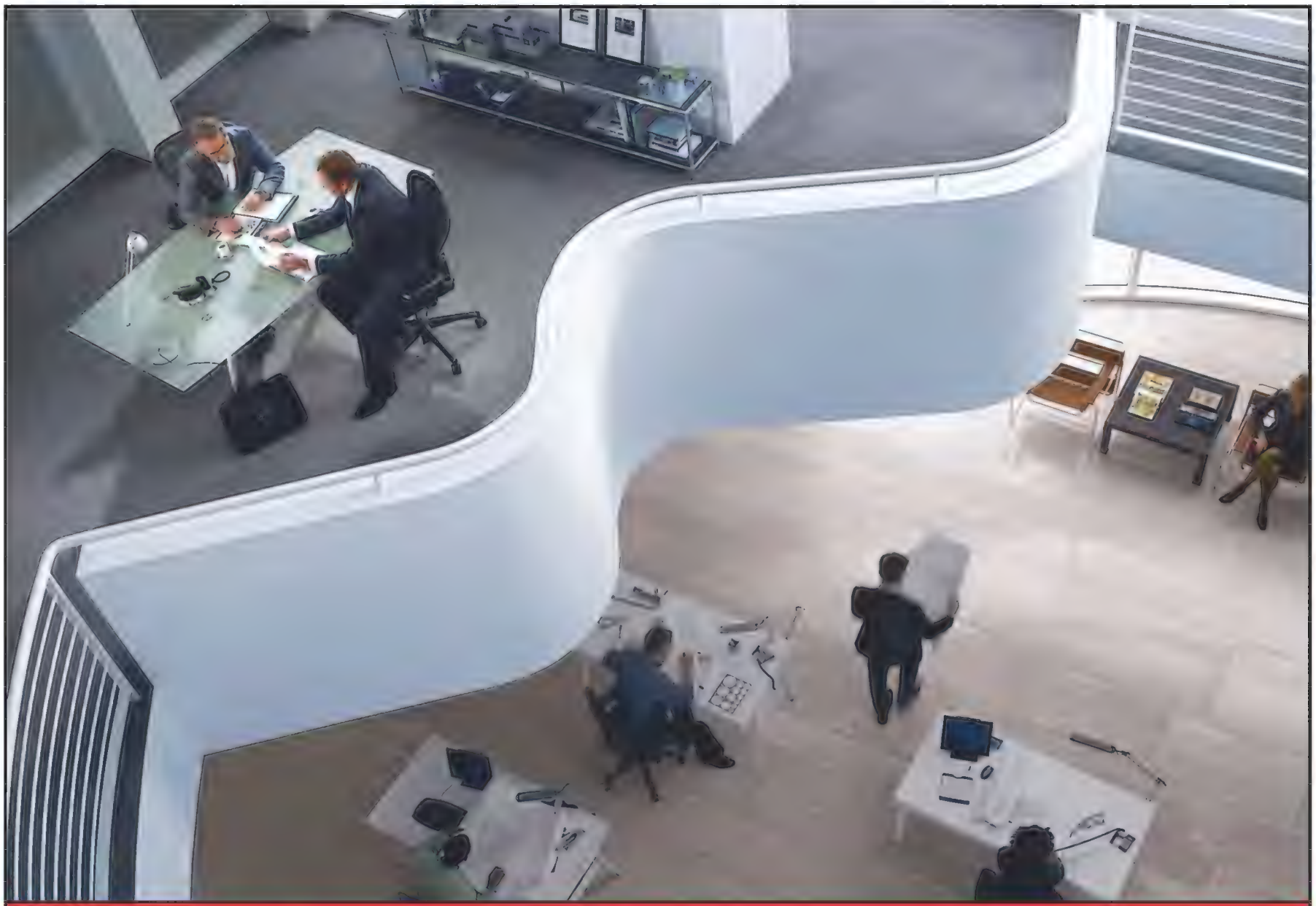
UNMASKING GEORGE WASHINGTON

WHAT DID HE LOOK LIKE BEFORE HE BECAME THE ELDERLY FOUNDING FATHER KNOWN TO ALL? CURATORS ARE TURNING TO FORENSIC SCIENCE FOR CLUES TO HIS LOST YOUTH

NOT EVEN GEORGE WASHINGTON is immune to the current makeover craze. But scholars hoping to overhaul his image—the tight-lipped bewigged old George we see on a dollar bill—drew a blank when they set out to portray him as a youth. The problem? There are no pictures of Washington under 40, before tooth loss, bone-jaw decay and other ravages of time altered the First Face. The solution?

Analysis of the founding father's choppers—and a new field of study that might be called forensic portraiture.

Mount Vernon Estates and Gardens, in Virginia, where Washington lived from 1761 until his death in 1799 (and today a Smithsonian-affiliated museum), instigated the research. For an exhibition next October, it plans to present life-size sculptures of the 6-foot-3 Washington as a presidential nominee



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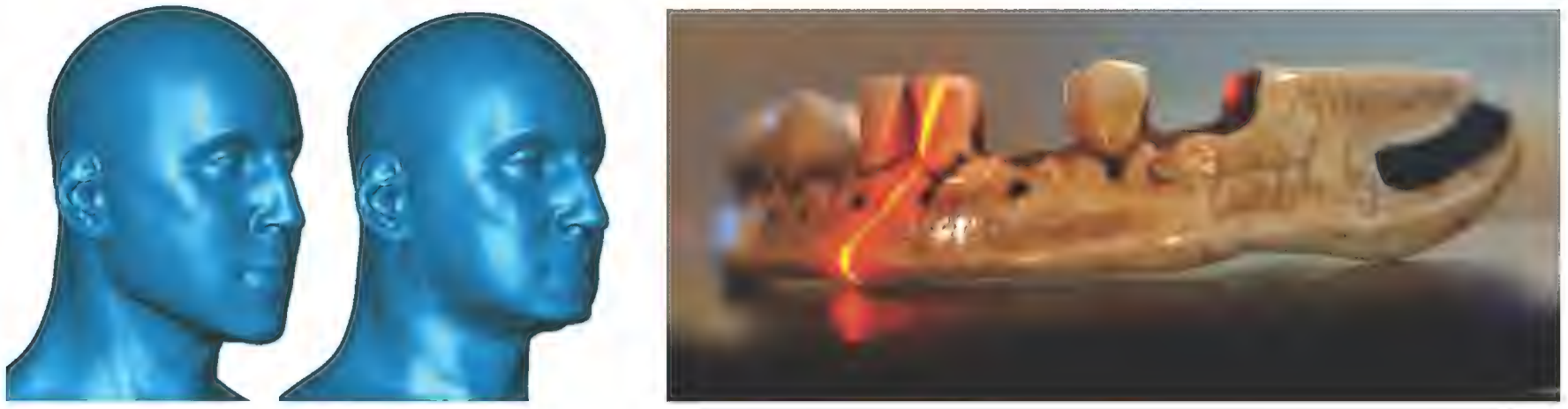


Computer models of Washington (at age 19, left, and 57), based on study of his dentures (above), show a deteriorating jaw line.

at 57, a soldier at 45 and a surveyor at 19. People are so accustomed to seeing his venerable visage, says Mount Vernon director Jim Rees, they tend to forget he was the "most physically impressive of the founding fathers."

To help visualize the young man (and humanize the historic figure), the museum turned to Jeffrey Schwartz, a University of Pittsburgh physical anthropologist, who specializes in teasing out details about early human beings from fossil remains. Schwartz began by examining Washington artworks and artifacts, including a 1785 life mask made by French sculptor Jean-Antoine Houdon, eyeglasses and false teeth.

Washington started losing his teeth in his 20s, and by the time he became president in 1789 he had only one left. An original set of his lower dentures, made in 1795, is housed at the Dr. Samuel D. Harris National Museum of Dentistry, in Baltimore (also a Smithsonian affiliate). Made from hippopotamus ivory—not wood as commonly believed—the spring-loaded dentures "were terribly uncomfortable to wear," says dental museum curator Scott Swank.

With a computerized laser scanner, Schwartz took precise measurements of the dentures, the life mask, the jaw of an 18th-century human skeleton similar to the first president's, and a bust created by Houdon in 1785, fourteen years before Washington died. Schwartz combined data from those objects to create a 3-D computer model of Washingon at 53.

Though plastic surgeons and law enforcement officials routinely use computer programs that simulate how a face might age, the process is seldom done in reverse, to suggest how people looked years before. Schwartz took a decade off the digital quinquagenarian Washington by modifying it with the stronger jaw line and other features evident in portraits of Washington in his 40s by Charles Willson Peale. Then the anthropologist created a digital teen by, among other things, making the lower jaw more prominent, as it surely would have been with a full set of healthy teeth.

The preliminary computer images, created at a computer-imaging research center at Arizona State University, and colored blue to enhance certain details, have served as the basis of the wax and plaster sculptures of Washington at the different ages. The sculptures are currently being painted and also outfitted with real human hair. "When they see him with his red hair and beard," says Mount Vernon's Rees, "people are going to be shocked." —*JOHN F. ROSS*

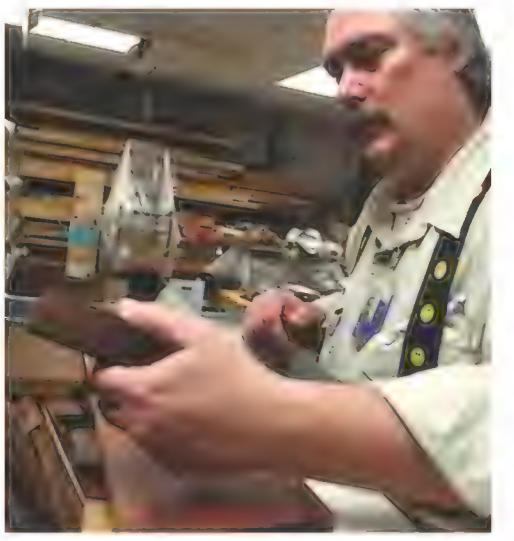
JEFFREY H. SCHWARTZ AND PARTNERSHIP FOR RESEARCH IN SPATIAL MODELING / MOUNT VERNON LADIES' ASSOCIATION (2); JED KIRSCHBAUM / BALTIMORE SUN; MICHAEL TEMCHINE

HOW TO CLEAN A HARPSICHORD (AND OTHER HINTS)

STORING PATCHWORK QUILTS in a cedar chest? Not the best idea, says Don Williams, a Smithsonian Institution furniture conservator and co-author of *Saving Stuff* (Simon and Schuster/Fireside). A chest isn't bug-proof, and cedar oils can stain textiles. Instead, seal them in an airtight plastic container.

The 50-year-old Williams, a 21-year Smithsonian veteran who started out as a woodworker, usually stays in the background, taking care of artifacts such as Archie Bunker's chair. But the book has put him in the forefront of the do-it-yourself trend. He has been featured in newspaper and magazine articles, and he's fielding requests to appear on daytime TV talk shows. Other tips from Williams:

- Instead of polishing wood furniture with oil (it darkens the finish), use paste wax.
- To read an old book that has a deteriorating binding, prop it up with pillows.
- Store vinyl record albums, cassette and reel-to-reel tapes vertically, and CDs and DVDs horizontally.
- Save baby's first shoes by stuffing them with acid-free paper or polyester quilt batting and storing them in a zip-lock bag.



Williams: Paste wax and pillows.

How is Williams saving all the articles about *Saving Stuff*? "I have an oversize archival folio, and I'll place it in deep storage inside a plastic container with a sachet of charcoal briquette." —*ERIN DORR*

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Artistically Yours

A book of artists' illustrated letters showcases the imperiled practice of handwritten correspondence

IN 1949, long before his Campbell's Soup cans and Marilyn Monroe portraits made Andy Warhol the patriarch of Pop Art, he wrote a two-paragraph letter to an editor at *Harper's* magazine who had asked for a biography to accompany one of Warhol's illustrations. Underneath a cartoon head bearing a lopsided smile that seemed to mock the request, Warhol, then 21 and a recent graduate of Carnegie Tech in Pittsburgh, scribbled that his life couldn't fill a penny postcard: "Now I'm in NY City moving from one roach-infested apartment to another."

A 1949 Andy Warhol letter was self-effacing.

"In this letter he's very demure," says Liza Kirwin, a curator at the Smithsonian Archives of American Art. "He's saying, 'I don't have a biography,' and you don't know whether that's tongue in cheek or not." It's one of 96 illustrated letters by American artists in Kirwin's new book, *More Than Words* (Princeton Architectural Press), which draws on past exhibitions and marks the archive's 50th anniversary.

The book includes sketches and scribbles from such eminences as Andrew Wyeth, Winslow Homer, Alexander Calder and Thomas Eakins, but the lesser-knowns steal the show. In 1940 Moses Soyer (1899-1974), a New York realist painter, wrote a letter to his only son, David, who was attending a Connecticut summer camp. Soyer captured daily life around the household—the family dog and cat, himself and his wife, Ida. "The letters were important to me because they were a connection to another world," recalls David Soyer, now 77 and living in New York City. He says that he especially cherished the drawing of famed pitcher Dizzy Dean because his father wasn't a baseball fan.

DEAR David Monday
That was a swell letter you wrote us. The illustrations were swell too. I guess that by the time you receive this letter it will have been swimming very warm in the city
much that's new except the war.
I see by the papers that Dizzy Dean will try a pitching comeback in the minors. The Cincinati Reds are in the lead so far and so is still Tinkerbelle growing. Is Jester getting his injections
P.S. I am sending you the glove today
DEAR PAW and MAW
DIZZY DEAN
LOVE FROM DA AND ME.

Venice 8th September 1894.
Dear Mother and Father.
Behold Joe eating fruit!
Delicious fruits are here in Venice now. and I
consume vast quantities of it. Melons pears
peaches plums apples figs. grapes and other things
unknown to my interior.
To-day is a grand "festa" and I am
Taking a half holiday. The festa has come to a head
in the church opposite the Ragbetto and the smell of
frying things comes across the canal from the
little campo where the booths are steaming with things in
shiny brass plates. and the
kettles.
There is to be music in the piazza to-night. and
on the Grand Canal. and the 22nd of March street
and the campo are to be illuminated.
I eat fruit so much of the time and so much at
a time that I go to bed at night expecting

In 1940, Moses Soyer wrote to his son of home and baseball (above). Joseph L. Smith's 1894 letter was fruit-flavored.

Joseph Lindon Smith (1863-1950) was a 30-year-old painter studying in Venice when he wrote home in 1894 bemoaning his excessive fruit intake. One side of his letter is sprinkled with miniature plums and peaches, while the other shows his twisted, discolored face—a dyspeptic grimace.

Pain of a different sort was evident in a 1943 letter by watercolorist Waldo Peirce (1884-1970). Writing to one of three women whose affections he shared, he showed each at a table delicately slicing a piece of his heart.

The witty, warm missives in *More Than Words*, which date from the late 1800s up through 1995, make one wonder if personal correspondence is in danger of dying today. Susan Whyman, a retired Princeton historian who is at work on a book about the culture of 18th-century English letter writing, says the practice is more popular than ever—thanks to e-mail. But Kirwin suggests that a couple of lines dashed off at a computer keyboard are a long way from the handmade, colorful one-of-a-kind works she has collected. "You can speculate whether the written letter will make a comeback," Kirwin says. "But now, it is something of another world."

—*CHRISTINE DELL'AMORE*

To view additional illustrated letters from the Smithsonian Archives of American Art, go to www.smithsonianmag.com.

LEFT TO RIGHT: ANDY WARHOL / ARCHIVES OF AMERICAN ART, S.I.; JOSEPH LINDON SMITH; ARCHIVES OF AMERICAN ART, S.I. (2); MOSES SOYER / ARCHIVES OF AMERICAN ART, S.I.

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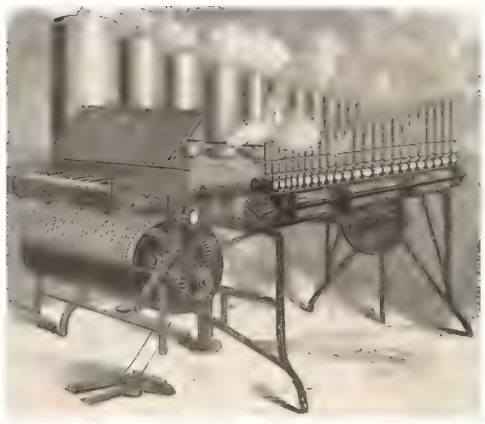
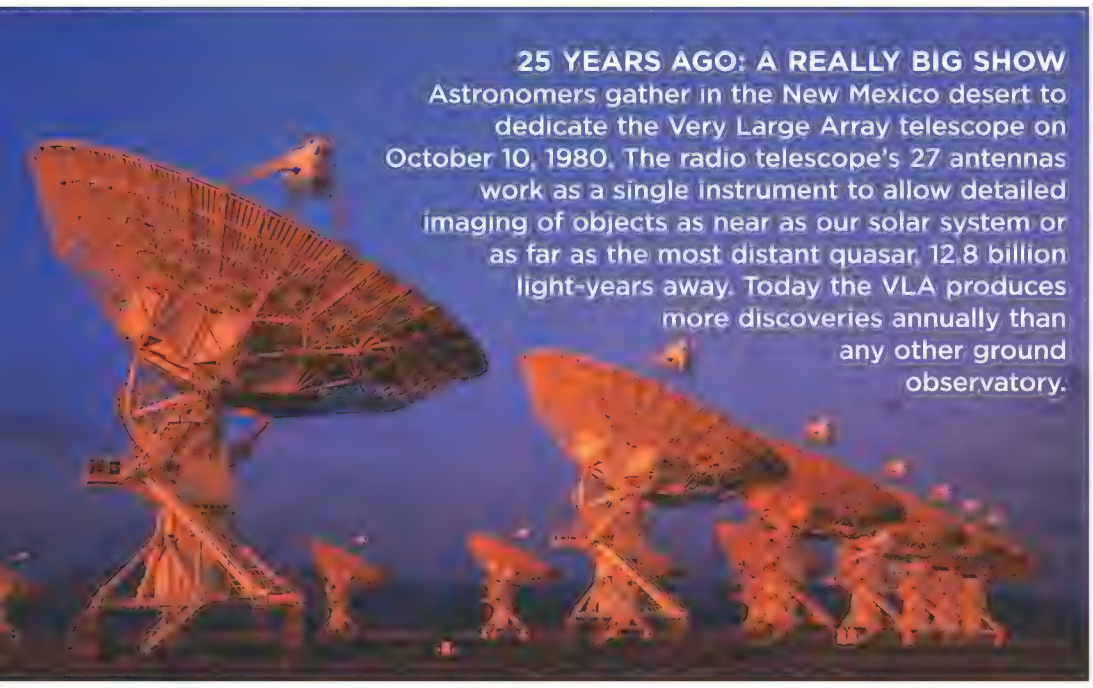


150 YEARS AGO: DARN TOOTIN'

Massachusetts beekeeper J. C. Stoddard patents the calliope, October 9, 1855. Fond of the sound of locomotive whistles, Stoddard affixes 15 of them of varying sizes on a steam chest, with a music box cylinder to open the valves. Though his hometown quickly bans it, the calliope becomes the signature sound of riverboats and circus parades. Stoddard patents a hay rake in 1879 and a fire escape in 1884, and dies in 1902.

200 YEARS AGO: SEA WORTHY

Admiral Horatio Nelson, 47, leads an outnumbered British fleet in a two-pronged fight against Napoleon's force of French and Spanish ships off the coast of Spain's Cape Trafalgar on October 21, 1805. The British triumph in the five-hour battle thwarts Napoleon's plans to invade England and asserts the Royal Navy's supremacy on the high seas, but it is not without cost: some 6,000 French and Spanish and 1,700 British seamen are wounded or killed, including Nelson, who dies thanking God "I have done my duty."

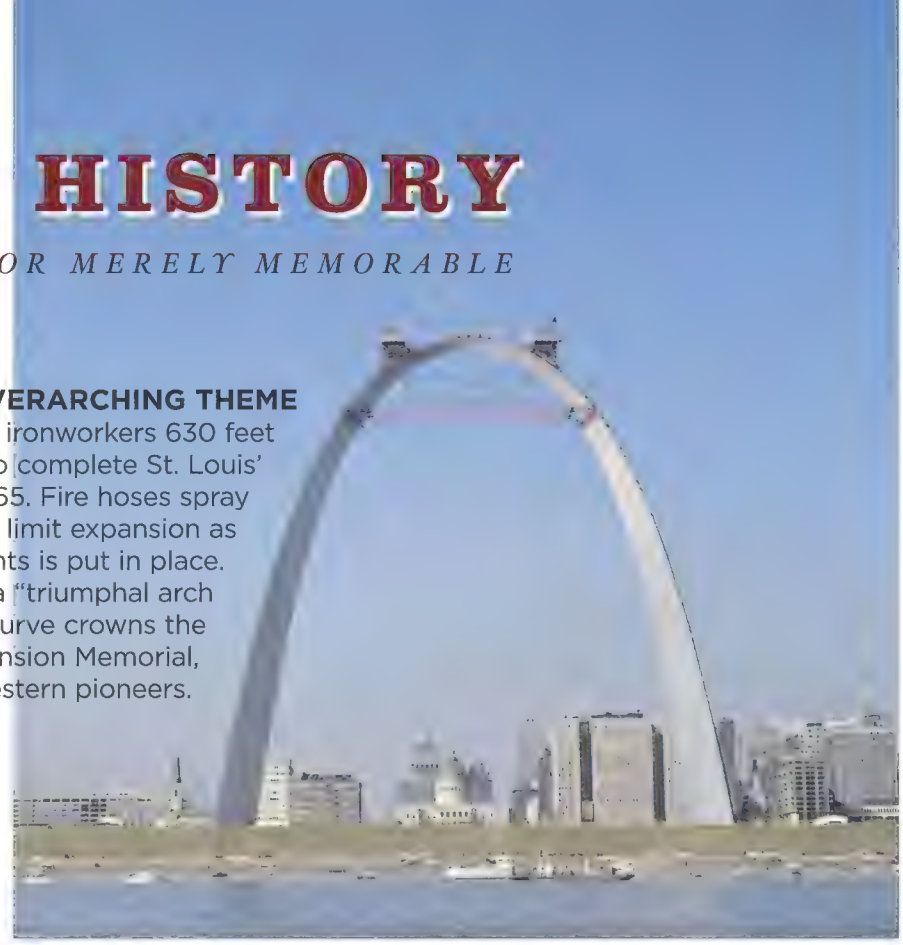


25 YEARS AGO: A REALLY BIG SHOW

Astronomers gather in the New Mexico desert to dedicate the Very Large Array telescope on October 10, 1980. The radio telescope's 27 antennas work as a single instrument to allow detailed imaging of objects as near as our solar system or as far as the most distant quasar, 12.8 billion light-years away. Today the VLA produces more discoveries annually than any other ground observatory.

40 YEARS AGO: OVERARCHING THEME

As 10,000 viewers stare skyward, ironworkers 630 feet up maneuver a 10-ton keystone to complete St. Louis' Gateway Arch, on October 28, 1965. Fire hoses spray water on the sun-warmed steel to limit expansion as the last of 142 triangular segments is put in place. Designed by Eero Saarinen to be a "triumphal arch for our age," the gleaming curve crowns the Jefferson National Expansion Memorial, celebrating the spirit of the Western pioneers.



100 YEARS AGO: WILD THINGS

Scandal fills room seven of the 1905 Salon d'Automne art show in Paris as viewers reel before the vivid, unnatural hues, unbridled brushstrokes and almost abstract landscapes hung there. The artists, among them Henri Matisse, André Derain (left, his *Mountains at Collioure*, also from 1905) and Maurice de Vlaminck, quickly become known by a reviewer's epithet: Les Fauves (The Wild Beasts). Using color for color's sake, the Fauves catch the modern eye until 1908, when Cubism offers a new point of view.

180 YEARS AGO: WATER WEDDING

New York governor DeWitt Clinton takes the inaugural voyage on the Erie Canal, leaving Buffalo for New York City aboard the packet boat *Seneca Chief,* October 26, 1825. The 363-mile canal, eight years and $7 million in the making, links Lake Erie to the Hudson River. At the end of his nine-day trip along "Clinton's Folly"—he had predicted the canal would create "the greatest inland trade ever witnessed"—Clinton pours a barrel filled in Lake Erie into the Atlantic in a "wedding of the waters." His prediction is on the mark: shipping costs drop by 90 percent, settlers flood west and the canal pays for itself in nine years. —*ALISON McLEAN*

CLOCKWISE FROM TOP LEFT: ILLUSTRATED LONDON NEWS / MARY EVANS PICTURE LIBRARY; BETTMANN / CORBIS; ANDRE DERAIN, "MOUNTAINS AT COLLIOURE, 1905" JOHN HAY WHITNEY COLLECTION, NATIONAL GALLERY OF ART; GRANGER COLLECTION; CORBIS; J. M. W. TURNER, "BATTLE OF TRAFALGAR, 21 OCTOBER 1805" GREENWICH HOSPITAL COLLECTION, NATIONAL MARITIME MUSEUM, LONDON

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Smithsonian
OCTOBER 2005 VOLUME 36, NUMBER 7

No one disputes the beauty of the Arctic National Wildlife Refuge's coastal plain, with the majestic Brooks Range looming behind it. But where some see the 1.5 million acres in northeastern Alaska as the calving grounds for the Porcupine River caribou herd, others see billions of barrels of oil waiting to be extracted.

ANWR
THE GREAT DIVIDE

The renewed debate over drilling for oil in Alaska's **Arctic National Wildlife Refuge** hits home for the two Native groups nearest the nature preserve **BY SCOTT WALLACE**

ear that howling out there?"

Charlie Swaney asked, cocking an ear and shifting the weight of the rifle slung on his shoulder. The cry of a lone wolf echoed in the distance. "That's a good sign. When there's wolf around, that means they're following the caribou."

It was just after 4 a.m., and the Arctic sky was smeared with orange rippled clouds that hung low over the mountains to the north. Songbirds greeted the dawn with riotous chirping from the tops of spindly spruce trees, whose black silhouettes rose straight around us.

Half Gwich'in and half Ahtna Indian, Swaney, 47, has lived all of his life in the boreal forests of the Alaskan north. On this chilly morning in early May, he wore a hat made from a wolverine he trapped years ago pulled down tight on his thick salt-and-pepper hair.

The night before, we had sat drinking coffee at his kitchen window, looking out on the mountains blanketed in snow as he dispensed tidbits of Native wisdom. If you see wolves digging in the snow, most likely an avalanche has buried a group of caribou there. If you kill a crow for no good reason, the weather will turn bad. "It's true," he insisted when he saw my raised eyebrow. "I've seen it happen."

What is certain is that when Swaney and his fellow Gwich'in hunters bring back fresh caribou to their homes in Arctic Village, they bring joy as well—especially to the children. "Their attitude changes," he said. "You can see it in their faces. They know they're going to be eating good."

Our hunt would begin at dawn with five other men. The caribou had been sighted two days earlier by bush pilots out on the tundra south of Arctic Village. The animals were probably from the Porcupine River caribou herd, the unlikely focus of one of the most intractable and divisive environmental debates in our nation's history: whether the Arctic National Wildlife Refuge, or ANWR, should be opened up for oil exploration.

Down in the lower 48, the tangle between oil industry proponents and environmentalists, between Republicans and Democrats and between conservatives and liberals over ANWR centers on issues of energy self-sufficiency versus preservation of a pristine wilderness. But here, above the Arctic Circle, the debate is less abstract, with two Native Alaskan peoples locked in a complex dispute over oil development on the coastal tundra.

On one side are the militantly traditionalist Gwich'in—7,000 people living in 15 settlements scattered along the caribou's migration route between northeastern Alaska and the Canadian Yukon. On the other are roughly 9,000 Inupiat Eskimo, whose once-ramshackle coastal villages have been transformed into modern communities with schools, clinics and indoor plumbing since oil started flowing from Alaska's North Slope in the late 1970s.

SCOTT WALLACE has covered indigenous people throughout the Americas. This is his first article for SMITHSONIAN.

MICHIO HOSHINO / MINDEN PICTURES; PP. 48, 49 ART WOLFE

The Porcupine River herd migrates (facing page) to the coastal plain's 1002 area to calf in the spring. The refuge, and whether to exploit its oil riches, divide the Gwich'in people of Arctic Village and the Inupiat of Kaktovik.

DOUG STERN

THE CARIBOU ARE THE UNLIKELY FOCUS OF ONE OF THE MOST DIVISIVE ENVIRONMENTAL DEBATES IN OUR NATION'S HISTORY.

The Gwich'in fear that drilling in ANWR will put an end to their existence as subsistence caribou hunters, while the Inupiat worry that without development of ANWR's gas and oil reserves, the money to support their modern comforts will disappear. To most Gwich'in, the Inupiat are motivated by greed, and have sold out their traditional culture for the lure of oil dollars; to many Inupiat, the Gwich'in are hopeless romantics, living voluntarily in squalor to cling to a way of life that is bound to disappear.

Though ANWR's coastal plain hosts a dazzling abundance of wildlife—the largest concentration of land-denning polar bears in Alaska; enormous flocks of migratory birds; wolves, wolverines, musk ox, Arctic fox and snowy owls—the caribou remain the symbol of the fight over the refuge. It's the one animal that moves through the full range of Arctic and subarctic ecosystems: barrier islands, coastal plain, mountain talus, boreal forest and alpine tundra. Even the boundaries of ANWR were largely determined by the range of the Porcupine River herd.

Some of the herd, which numbered 123,000 when last counted in 2001, migrate nearly 3,000 miles each year, zigzagging to and from their calving grounds on a long, narrow strip of coastal plain some 150 miles north of Arctic Village. Though the plain takes up a relatively small corner of the 19.6 million-acre refuge, conservationists describe it as ANWR's most important and environmentally sensitive area. The Gwich'in call it the "sacred place where life begins." An idyllic nursery for the nearly 40,000 caribou calves born here each year, it provides protection from wolves and grizzlies, while offering a diet of nutritious grasses for the calves' lactating mothers. The plain also happens to sit atop what is believed to be billions of barrels of untapped oil.

Unseasonably high spring temperatures were rapidly melting the snow around Arctic Village, so Swaney and his fellow hunters (see "On a Caribou Hunt," p. 56) had to move quickly. This would be their final chance to secure meat to last their families until fall, when they would hunt the cari-

bou again as the animals returned from the coastal plain. But this year, with Congress on the verge of deciding whether to allow oil drilling on the coastal plain, the Gwich'in have far more on their minds than the success of the season's hunt.

They fear that the caribou could shift their migration routes away from Native villages or even cease to exist as a migratory herd if oil development begins in the refuge. While the Gwich'in hunt other game, such as moose and ptarmigan, they call themselves the "People of the Caribou" and say the blood of the animal flows in their veins. The caribou figures in all of their rituals, traditional dances and stories, and nothing marks their annual calendar like the comings and goings of the Porcupine herd. More prosaically, the caribou is the Gwich'in's major source of food. "If it's gone," said Swaney, "what are we going to do?"

THE INUPIAT Eskimo village of Kaktovik, Alaska, is on Barter Island, just offshore from the mainland. Once a trading center for whalers and hunters who plied the frigid waters along the Arctic coast, today Kaktovik is a village of prim, oil-heated houses, wide, gravel streets, a large, fully-staffed school, a police station and a power plant. All of it has been made possible by tax revenues generated from the Prudhoe Bay oil fields, about 100 miles to the west, during the past three decades of oil production on the North Slope.

THE GWICH'IN SAY THE INUPIAT HAVE SOLD OUT THEIR TRADITIONAL CULTURE FOR THE LURE OF OIL DOLLARS.

Just a stone's throw south of town lies ANWR's coastal plain—1.5 million acres of tundra potentially available for oil exploration, hemmed in between the slopes of the Brooks Range and the Arctic shore. The tract is called the "1002" area (universally referred to as "Ten-Oh-Two") for a clause in the 1980 federal legislation that expanded the refuge to include much of the U.S. range of the caribou herd while, at the same time, setting aside the coastal plain for possible future oil and gas development.

Most of Kaktovik's 300 residents are shareholders in two Native natural resource companies—the Kaktovik Inupiat Corporation and the Arctic Slope Regional Corporation, or ASRC. Respectively, the companies own the surface and subsurface rights to 92,000 acres within the 1002 area and stand to reap a windfall if there's a major oil strike on ANWR's coastal plain.

With $1.32 billion in revenue last year from consulting and oil industry support services, the ASRC is among the most successful of the 13 Native regional corporations established by the 1971 Alaska Native Claims Settlement Act. The legislation required Native Alaskans to relinquish aboriginal claims to their land in exchange for collective corporate ownership of 44 million acres throughout Alaska, apportioned among the 13 corporations, and $1 billion in start-up funds. The corporations were then free to lease the land.

The Gwich'in of Arctic Village and neighboring Venetie chose not to participate in the land distribution under the act and also declined the seed money that the rest of Alaska's Natives have used to improve, in many cases dramatically, their standard of living. Instead, the Gwich'in held on to their land—almost two million acres of spruce taiga, rolling foothills, twisting, braided rivers and vast stretches of alpine tundra bordering ANWR's southern flank. Now they have their homeland and its abundance of fish and wildlife, but they enjoy few of the creature comforts the Inupiat have on the North Slope.

Carla Sims Kayotuk, 38, is torn. She was raised in Kaktovik, and today her family owns one of the village's two grocery stores. Although she worries that unsightly oil pipelines, the high-pitched scream of winches and the clatter of helicopters will forever mar the tranquil landscape close to her village, she also worries about declining oil production in the Prudhoe Bay fields. "If we don't have the oil development," she says, "where are we going to get our money from?"

"We've never thought of ourselves as poor," says Sarah James (below). "We're rich in our hearts." Danny Gemmill (below right) says drilling proponents "don't know what wilderness is about." Charlie Swaney, with Mutt, has always lived in the Arctic woods.

SCOTT WALLACE (4)

As I walked around Kaktovik's windblown streets, a small car pulled up beside me. Crammed into the compact was Robert Thompson, a burly 58-year-old Inupiat wilderness guide. He offered me a tour of the island, where—despite the oil money—many people still derive much of their diet and cultural identity from subsistence hunting and whaling. We cruised slowly past Kaktovik's tidy modular houses, out past the large aluminum hangar that serves as the town's airport.

THE GWICH'IN: PEOPLE OF THE CARIBOU

Raymond Tritt, 52, dresses a fallen bull on the spring caribou hunt. Like virtually every Gwich'in man, he still remembers every detail of his first successful hunt, four decades later. The 100,000-plus caribou of the Porcupine River herd are a focal point for the Gwich'in people; they are a main source of sustenance as well as the key element in the group's rituals, dances and stories. "If we lose the caribou," says a tribal elder, "we lose our way of life."

Thompson says he finds the Gwich'in's defense of their cultural values "admirable," adding that the prospect of oil development on the nearby tundra has opened a rift among local residents. We passed an SUV idling at a stop sign amid a cloud of exhaust and vapor. As if to prove Thompson's point, a local Eskimo official, sitting impassively behind the wheel, responded to Thompson's wave with an icy stare. "He used to wave," Thompson shrugged. "But now he doesn't."

This past spring, nearly one-third of Kaktovik's voting-age adults signed a petition opposing oil development in ANWR—fearing, according to Kayotuk, that onshore oil drilling would lead to offshore leasing, endangering the annual bowhead whale hunt, the core of the Eskimo culture across the North Slope.

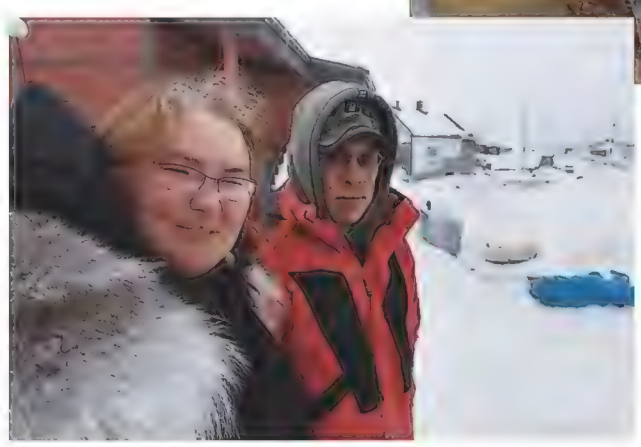
Still, most Kaktovik residents support oil development in the 1002, though they would agree with Karl Francis, a pro-oil adviser retained by Kaktovik's city council to serve as a buffer between local authorities and the outside world. It must be done "responsibly," he says, with minimal impact on the environment, hunting and whaling to ensure the long-range survival of the people and their traditions. Those who favor drilling, he acknowledged, also hope that outside corrosive effects, such as drugs and alcohol, can be kept at bay even after the road needed to develop the oil fields reaches Kaktovik.

"This is a little village living on a time bomb," Francis said. "We're sitting on top of a huge pool of oil, and the people here need to have a say about how it's developed. We're trying to strategize how this town will be around 200 years from now, with everyone happy and healthy."

THE INUPIAT: DRIVEN BY OIL?

Like many other villages across the Arctic, Kaktovik reaps the fruits of oil production on Alaska's North Slope: a new school, a police department, electricity and, just recently, indoor plumbing. A major oil strike on ANWR's coastal plain, two miles south of Kaktovik, could mean a windfall for many of the Inupiat villagers. Still, their support for drilling there is tempered by concern that it could lead to oil exploration offshore, which could threaten whaling.

THE FRONTIER AIRWAYS prop plane cleared the Kaktovik runway, climbing up through spotty turbulence into a vast milky whiteness in which sky, land and sea were virtually indistinguishable. After about 15 or 20 minutes, the first of the Prudhoe Bay oil rigs came into view, looking like a squat sentinel keeping watch over the barren tundra. Soon I could see an entire maze of roads, huge rectangular plastic-lined reserve pits for leftover drilling fluids, gas flares, gravel drill pads and miles of large-diameter pipe set above the permafrost on stilts, snaking off into the distance—a colossal industrial complex sprawling across the land.



Since 1977, at least 14 billion barrels of Alaskan crude have been pumped from the North Slope through the Trans-Alaska Pipeline System (TAPS) to its terminus at the port of Valdez, 800 miles to the south. The oil industry has created tens of thousands of jobs in Alaska while generating mind-boggling wealth; $69 billion in oil revenues have flowed into state coffers as of 2004. The North Slope Borough, a county-level jurisdiction that encompasses most of the Arctic coastal communities on the North Slope, collects tens of millions of dollars in additional taxes from the oil fields each year.

But North Slope production is drying up, fueling the clamor to develop ANWR. Officials from the oil industry and the Arctic Slope Regional Corporation, sensitive to the public outcry that has accompanied the prospect of drilling in the refuge, say they can "shrink the footprint" using new technologies and directional drilling to reduce environmental damage. Industry lobbyists, and President Bush himself, say that a mere 2,000 acres would be directly affected. But drilling opponents argue that the affected land would not be concentrated on one patch of ground but rather would be sprawled across the 1002 area—a spider web of roads, pipes and drilling pads.

I could find no one who knew for sure where the 2,000-acre figure originated, but energy consultant Ken Boyd, the former director of oil and gas for the State of Alaska, says he believes it's extrapolated from actual operations at the state-

SCOTT WALLACE (5)

of-the-art Alpine field west of Prudhoe Bay. Boyd acknowledges that the figure may be wildly inaccurate and that it does not include the miles of pipeline that would be necessary to move oil out of the refuge. "I believe that with current technology, most of the pipeline from ANWR will be aboveground," Boyd says. "If they could bury the pipeline, that would solve the footprint problem."

There's also disagreement over what drill rigs in ANWR would mean for the caribou. Matthew Cronin, a University of Alaska at Fairbanks professor of population genetics and a consultant to the oil industry, believes wildlife and industrial development can coexist. He points to the six-fold growth since the late 1970s of the Central Arctic herd, now some 32,000 caribou strong, despite a tangle of roads and pipelines in and around the Prudhoe Bay oil fields. "There is abundant evidence showing caribou using habitat around oil fields," he told me.

Carla Sims Kayoktuk, (with husband, Lee, lower left) co-owns a village grocery store (left). Bicycling in snow is tough, so Robert Thompson (below) prefers dog sledding. Says Oliver Leavitt, in Barrow, of the oil-fueled economy: "Nothing else sustains jobs."

But Fran Mauer, a biologist who spent two decades working in the refuge for the U.S. Fish & Wildlife Service, says both the terrain and the demographics of the Porcupine herd are vastly different from those of the Central Arctic herd. The Brooks Range in ANWR, he says, constricts the Porcupine herd's nursery to an area about one-fifth the size of the Central herd's. And the Porcupine herd is four times larger than the Central herd, making for extremely crowded conditions. Were oil development to push the Porcupine herd up the mountain slope to calve, as many expect, Mauer says the young caribou will be far more vulnerable to natural predators: wolves, bears, wolverines and raptors.

Just a 5 percent decline in calf survival, Mauer went on, might result in an irreversible decrease in herd size. And smaller herds occupy smaller ranges, making them less migratory. "That's where the Gwich'in come in," Mauer added. "They live on the winter grounds, near the migratory routes. You shrink the range, and you reduce the availability of subsistence hunting for the Gwich'in."

Cronin counters that suspending drilling and major traffic during calving season would go a long way toward minimizing that scenario. "If you just stopped the airplanes, drilling and trucks for one month or six weeks," he said, "you could mitigate a lot of the impact."

THE SPRING WHALE HUNT was nearing its end in Barrow, the northernmost city in North America and the nexus of Eskimo political and economic power. The town (pop. 4,600) is the seat of the North Slope Borough and is the headquarters for the Arctic Slope Regional Corporation. It is also home to some 800 Native American households with a median family income of about $68,000.

By the time I arrived, whaling crews captained by Barrow's most prominent citizens had already brought in a dozen bowhead whales. As I drove through the town's most affluent neighborhood with ASRC vice president of government affairs Oliver Leavitt, himself one of Barrow's leading whaling captains, he pointed to the upper-story cedar decks of several houses, where what looked like signal flags snapped in the breeze. The flags were emblazoned with the emblems

THE INUPIAT SAY THE GWICH'IN ARE CLINGING TO A WAY OF LIFE THAT IS BOUND TO DISAPPEAR.

of the captains whose crew had brought home a whale. Enormous slabs of pale red meat lay neatly stacked in crimson snow alongside one large, attractive home. "They're having a feast here tomorrow," Leavitt said. "It's part of our tradition; it's the communal spirit of the hunt."

Leavitt, 62, is among the most eloquent defenders of the Inupiat's embrace of North Slope oil and the changes it has brought. "We just want our lives to be a lot easier but to still keep our traditions," he told me. "You lose some parts of the culture, but your life is much easier."

He pulled his SUV into Pepe's North of the Border, a Mexican restaurant, an establishment that seems startlingly out of place here above the Arctic Circle. Over chips and salsa, he told me that there was no point in offering resistance when the oil industry set its sights on Alaskan crude back in

Charlie Swaney, with fellow hunters: "Everything we need, nature gives us."

ON A CARIBOU HUNT

The Gwich'in hunters assembled outside Charlie Swaney's cabin before dawn, each emerging from the gloom of the pines straddling a sputtering snowmobile. As the sun cleared the distant ridge and poured golden shafts of light through the spruces, we jolted off, winding our way up through the forest. When we cleared the tree line, the hunters hit full throttle, and we raced across the empty snowfields toward the top of a long, flat mountain.

Once atop the ridge, we killed the engines, and the hunters trained their binoculars across the snow-covered tundra to our east. "Look!" shouted Daniel Tritt, 20, the youngest member of our party, pointing toward a barren ridgeline. A cluster of specks moved through the snow on the far side of the valley. Through binoculars, the animals appeared as a monochromatic tangle of crooked legs and brown-gray flanks against a white, snowy backdrop. The Gwich'in hunters fanned out over the open space to the deafening roar of their snowmobiles. The caribou fled down a gulch.

Adept as they may be at outrunning wolves and grizzlies, the caribou proved no match for swift machines and powerful rifles. The hunters topped the valley wall and came to a halt, dismounting from their snowmobiles. The Gwich'in advanced on the animals, rounds chambered in rifle barrels announcing the imminent assault. By the time the smoke cleared, nine caribou lay dead in the blood-stained snow.

Swaney and his companions set to work gutting the animals, deftly parting skin from muscle with bowie knives. "This is how we get our meat," Swaney said as he plunged both hands deep into the abdomen of a bull to remove its innards. "If the caribou move away, it'll be like having to go 70 or 80 miles to go to the store." Raymond Tritt hovered over another half-dissected carcass, his hands and knife dripping blood. With deeply lined face, hawkish nose and a red bandanna wrapped tightly across his forehead, the longtime hunter had the look of a warrior. "I just love it—the way I am, the subsistence life," he said. "I wouldn't trade it for nothing." —S.W.

the 1960s. "They were going to come and get it whether we liked it or not," he said. "Oil has caused wars. So we decided to join them."

As for the Gwich'in, he said, they made a huge mistake by not relinquishing their aboriginal rights to their land in exchange for federal money and the chance to create a Native for-profit corporation. "Someone has convinced them that the old ways are best, like the time of the buffalo. I don't know where they think they're leading their people." He paused to spear a piece of carne asada with his fork. "The enviros got to them," he said. "They needed someone on the other side that had a brown face."

But tell Sarah James, a member of the Gwich'in Steering Committee, that she's been duped by the Sierra Club, and she will say you don't know what you're talking about. "The environmentalists have every right to speak for the refuge. It's public interest land," she told me. "But they can't speak for us on the human rights issue. We speak for ourselves, and no one can do it better than us."

James, 61, was sitting on a stool in her bright, sunlit Arctic Village kitchen with a knife in one hand and a foot-long fish in the other. The season for grayling had begun in the East Fork of the Chandalar River just beyond the town, and some young men had brought her part of their first catch.

James and other committee members log tens of thousands of air miles a year, speaking at forums and meetings around the world to garner support for the Gwich'in opposition to oil development in ANWR. "We are the caribou people," she tells her listeners, and her people's "spiritual connection" to the caribou makes a human rights issue out of the proposed drilling in the animals' calving ground.

As I took my leave from her cabin, I remembered what her fellow Gwich'in Charlie Swaney had said about the Inupiat. "Why are those people up there in favor of the drilling?" he had asked rhetorically. "Because they're getting money from it. Who else is benefiting? Are we?" I looked around Arctic Village for the last time. Its small, weather-beaten cabins have no indoor plumbing and are heated only by crude wood stoves. Most lack even carpeting on their plywood floors. The roads are washed-out bogs this time of year. Junk heaps of discarded stoves, wrecked snowmobiles and rusted oil drums lie scattered about in the white tundra.

Suddenly, a young man wearing a ball cap and sweatshirt pulled up on a mud-spattered four-wheeler. Did I need a lift, Danny Gemmill asked. I was late for my plane, so I hopped on. After a time, we reached the top of the hill, and he cut the motor. We stood there for a moment, letting the silence and the soothing, muffled roar of the distant river wash over us. "When I'm out in the woods, I just feel like I'm inside the spirit world where I'm free," Gemmill said. He pointed north, out over the top of the spruce trees, over the distant Brooks Range, in the direction of the refuge. "No one knows what will happen if they open it up," he said. "Maybe we won't see the caribou again for 1,000 years."

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THE DYING THE DEAD

THE ANCIENT SALT SEA IS THE SITE OF A LOOMING ENVIRONMENTAL CATASTROPHE

BY JOSHUA HAMMER

The shores of the Dead Sea are lined with resorts and spas (where vacationers, right, enjoy full-body mud packs). But as its waters recede, gaping sinkholes (on the northwest shore, below) are swallowing portions of roads, date fields and buildings along the water's edge.

OF SEA

GIDON BROMBERG is nervous. On a sweltering August afternoon, the Israeli environmental activist leads me along the shore of the Dead Sea, watching every step we take. Towering sandstone mesas loom above our heads; the saline lake extends like a shimmering sheet of turquoise toward the hazy mountains of Jordan. The temperature is pushing 110 degrees, the sun beats down on my neck, and my feet crunch pieces of petrified driftwood and calcium deposits—wrinkled white sheets that bear a disturbing resemblance to human rib cages. Bromberg stops abruptly beside a gaping crater, more than 60 feet deep, and a sign that reads DANGER: OPEN PITS. "Better not walk any farther," he warns. "The ground could swallow us whole."

Up and down the Dead Sea, on the Jordanian and Israeli coasts, the shoreline is pockmarked by these sinkholes—testifying to an environmental catastrophe. The Dead Sea is shrinking, and as it recedes, the fresh water aquifers along the perimeter of the lake are receding along with it. As this fresh water diffuses into salt deposits beneath the surface of the shoreline, the water slowly dissolves the deposits until the earth above collapses without warning. More than 1,000 sinkholes have appeared in the past 15 years. In that time, sinkholes have swallowed a portion of road, date-palm fields and several buildings on the sea's northwest coast. Environmental experts believe that hotels along the shore are also in danger. "The good news is that if you get swallowed by a sinkhole, they name it after you," Bromberg deadpans.

MAP: MIKE REAGAN; P. 58 DAVID BLUMENFELD; P. 59-60 DAVID SILVERMAN / GETTY IMAGES (2)

As Israel and its neighbors (map) divert the waters that supply the Dead Sea, resorts are marooned. (At Ein Gedi Spa, below, a trolley ferries guests a mile to the beach.)

DAVID BLUMENFELD

Environmentalist Bromberg (at an Israeli hotel abandoned in the 1980s after the lake's waters receded): "This was the fanciest hotel on the Dead Sea—and it was left in the dust."

As we trudge back along the shore, Bromberg points out the Ein Gedi Spa, built along the waterline about 20 years ago. Today the resort sits marooned on a spit of wasteland almost a mile from the water; a trolley carries guests to and from the beach along a track that must be extended every year. Driving a few miles south, past the ancient Jewish fortress of Masada, we come upon Ein Bokek, a garish strip of high-rise hotels that calls to mind Atlantic City, New Jersey. Few tourists arriving at Ein Bokek are aware of the resort's not so little secret: the shallow water in front of the hotels isn't the Dead Sea, which dried up here in the 1980s. It is a reservoir maintained by Dead Sea Works, an Israeli company that pumps water from the northern to the southern part of the lake, where it is evaporated to extract minerals such as potash and bromide—a process hastening the sea's demise. "It's all artificial," says Bromberg. "But you're not going to hear that from the hotel management."

Bromberg was born and raised in Israel, graduated from American University's law school in Washington, D.C., and returned to Israel 17 years ago. Now he directs Friends of the Earth Middle East, the most active of several environmental groups working to galvanize concern for the dying sea. With a staff of Israelis, Palestinians and Jordanians, and with offices in Tel Aviv, Bethlehem and Amman, Friends of the Earth has become a model of regional cooperation at a time when most such ventures have all but disappeared.

During the past several years, Friends of the Earth has sponsored exhibitions of Dead Sea photographs and conducted tours for journalists and government officials. The organization has lobbied Jordan, Israel and the Palestinian Authority to nominate the Dead Sea as a United Nations World Heritage site—a designation that would mandate creation of an environmental protection plan and restrict development. The Friends have also pressured the region's governments to reform what they call "shortsighted" water policies that they say have been sucking dry the Dead Sea—and the rivers and streams that feed it—for decades.

The work has been difficult—and at times dangerous. During the most recent wave of Palestinian uprisings, beginning five years ago, simply bringing together staffers from Jordan, the Palestinian territories and Israel turned into a logistical nightmare. Islamic militants have opposed such joint ventures, accusing Arab staffers of acting as "collaborators"

JOSHUA HAMMER, former Newsweek *bureau chief in Jerusalem, is now the magazine's bureau chief in Cape Town, South Africa.*

with Israel. Four years ago, during an intense period of Israeli-Palestinian violence, gunmen fired on Friends of the Earth's Munqeth Mehyar as he drove away from his Jordanian office in downtown Amman. (He escaped without injury.) "We thought about closing the Amman office after that incident, but the staffers here said no way," Mehyar said. "They believed that would be giving in to terror." Instead, Mehyar and his colleagues received protection from Jordanian police and intelligence. The assailants were eventually captured.

CREATED BY THE SAME shift of tectonic plates that formed the Syrian-African Rift Valley several million years ago, the Dead Sea owes its precarious state to both human and geological factors. Originally part of an ancient, much larger lake that extended to the Sea of Galilee, its outlet to the sea evaporated some 18,000 years ago, leaving a salty residue in a desert basin at the lowest point on earth—1,300 feet below sea level. Since then, this body of water, known as the Dead Sea since Greco-Roman times, has maintained its equilibrium through a fragile natural cycle: it gets fresh water from rivers and streams from the mountains that surround it and loses it by evaporation. The evaporation process, combined with its rich salt deposits, account for its extraordinary—up to 33 percent—salinity (compared with the up to 27 percent salinity of Utah's Great Salt Lake). Until the 1950s, the flow of fresh water equaled the rate of evaporation, and Dead Sea water levels held steady. Then in the 1960s, Israel built an enormous pumping station on the banks of the Sea of Galilee, diverting water from the upper Jordan, the Dead Sea's prime source, into a pipeline system that supplies water throughout the country. To make matters worse, in the 1970s Jordan and Syria began diverting the Yarmouk, the lower Jordan River's main tributary.

Since then, the Dead Sea has declined dramatically. It needs an infusion of 160 billion gallons of water annually to maintain its current size; it gets barely 10 percent of that. Some 50 miles long in 1950, the sea is about 30 miles long today. Water levels are falling at an average rate of three feet per year. According to a recent Israeli government study, the rate of evaporation will slow and the Dead Sea will reach equilibrium again in a few decades—but not before losing another third of its present volume.

Such a scenario represents an immeasurable loss. Tourists have flocked here for generations to float in the brine, soak in mineral and mud baths and take in the dramatic panorama of Israel's Judean Desert and Jordan's Moab Mountains. Sufferers from chronic skin diseases, such as psoriasis and eczema, routinely make pilgrimages, attracted by the bone-dry climate, oxygen-rich atmosphere and—some claim—the sea's miraculous healing properties.

A refuge over the millennia for messiahs, martyrs and zealots, the Dead Sea region abounds with sites sacred to Islam, Christianity and Judaism. Some Muslims believe that Moses, whom they regard as a prophet, lies buried in a hilltop mosque just off the main road from Jerusalem. Jesus Christ was said to have been baptized in the Jordan River after traveling down to the Dead Sea from Galilee. At the fortress of Masada, nearly 1,000 Israelites committed suicide en masse in A.D. 73 rather than surrender to the Romans. Fifth-centu-

The region abounds in history: Here Christ is said to have been baptized (above, a 15th-century depiction) and shepherds discovered the 2,000-year-old Dead Sea scrolls in a cave in 1947.

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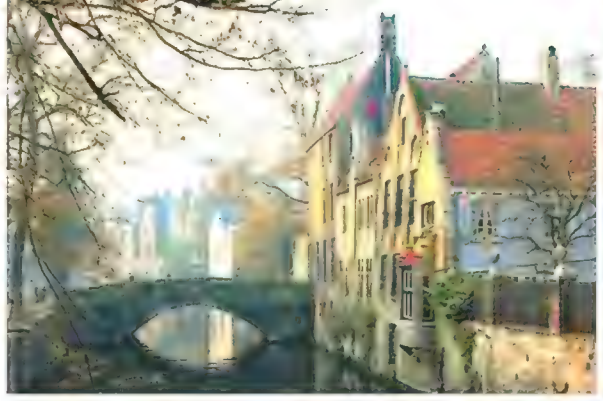

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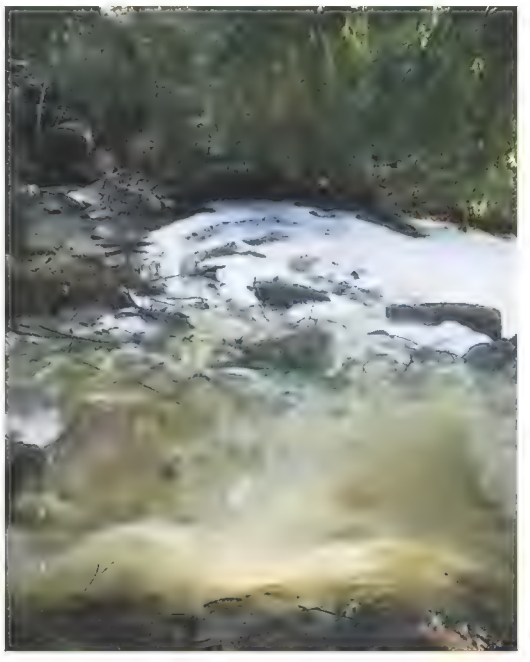
ry ascetics from Asia Minor retreated to the region's cliffside caves and built monasteries such as Mar Saba, the oldest continuously inhabited one in the world. In 1947, Bedouin shepherds, searching for a stray goat in the Judean Desert, entered a cave at Qumran near the north shore of the lake and discovered clay jars containing 2,000-year-old scripture written in Hebrew, Greek and Aramaic—the Dead Sea scrolls.

And despite its name, the Dead Sea helps support one of the world's most complex and vibrant ecosystems. Fed by fresh water springs and aquifers, a half-dozen oases along the shore harbor scores of indigenous species of plants, fish and mammals, including ibex and leopards. About 500 million birds representing at least 300 species, including storks, pelicans, lesser spotted eagles, lesser kestrels and honey buzzards, take refuge here during a biannual great migration from Africa to Europe and back again. Ein Feshka, a lush expanse of tamarisk, papyrus, oleander and pools of crystal water, was used by the late king Hussein of Jordan as a private playground in the 1950s and early '60s. But as the Dead Sea recedes, the springs that feed the oases are moving along with it; many experts believe that Ein Feshka and other oases could wither away within five years.



The Jordan River (polluted by sewage, above) is a main source for the Dead Sea. The river's flow has been reduced by diversion for farms and households.

IN APRIL 1848, when Palestine was a desolate outpost of the Ottoman Empire, American adventurer Lt. William Francis Lynch embarked on a U.S. Navy expedition to chart the course of the Jordan River to the Dead Sea. Lynch and his party of scientists and topographers set off in three vessels from the Sea of Galilee and quickly found themselves swept up in a frothing torrent. The river was hundreds of feet wide in some places, interrupted by "frequent and most fearful rapids," Lynch wrote. "Placing our sole trust in Providence [we] plunged with headlong velocity down appalling descents." They reached the Dead Sea after seven grueling days, losing one boat, which had been battered to pieces on the rocks.

The story of the Jordan River's decline begins at the very place where Lynch launched his boats in what is no longer a roaring torrent but a pond of sluggish green water. In 1953, Israel constructed a dam, the Degania Gate, a few hundred feet south of this spot, to collect water from the Sea of Galilee for the National Water Carrier project. The dam reduced the Jordan's flow to a trickle.

ABOUT FIVE MILES south of the dam, Bromberg and I enter the Degania kibbutz, one of Israel's oldest kibbutzim, or agricultural cooperatives, founded in 1909. We bounce along a rutted dirt track through corn, tomato and avocado fields, following two giant metal pipes that siphon off some of the Jordan's water for an extensive irrigation system. Dozens of other collective farms in the area also dip into the river. After a few minutes we arrive at a small earthen dam, where the Jordan comes to a pitiful end. On one side lies a stagnant pool covered by algae. A rusted rowboat is submerged beneath the surface. On the other side of the dam, liquid gushes from two pipes and flows down the riverbed. One flow consists of raw sewage from kibbutzim in the area. The other is saline water from springs flowing into the Sea of Galilee mixed with partially treated sewage from Tiberias, captured and removed to decrease the lake's salinity. The Jordan's once annual flow of 343 billion gallons of fresh water has now been replaced by 40 billion gallons or so of mostly sewage and saline water. Irrigation "is one of the main reasons that the Dead Sea is dying," Bromberg tells me.

Another reason, according to environmentalists and various government officials, is a water policy on the part of Israel, Jordan and Syria that encourages unrestricted agricultural use. From the first years of Israel's existence as a Jewish state, for example, when collective farming transformed much of it into fertile vineyards and vegetable fields, both Labor and Likud governments have bestowed generous water subsidies on the nation's farmers. The results have been disastrous: today, agriculture accounts for just 3 percent of Israel's gross national product and uses up to half of its fresh water. Recently, Uri Sagie, chairman of Israel's national water company, told a conference of Israeli farmers that a growing and irreversible gap between production and consumption looms. "The water sources are being depleted without the deficit being restored," he warned. Jordan lavishes similar water subsidies on its farmers with similar consequences: the kingdom takes about 71 billion gallons of water a year from the Yarmouk River and channels it into the King Abdullah Canal, constructed by USAID in the 1970s to provide irrigation for the Jordan Valley; Syria takes out another 55 billion gallons. The result is near-total depletion of the lower Jordan's main source of water.

SEVERAL DAYS LATER on another outing with Bromberg, we are hiking through the Ein Gedi Nature Reserve, on a ridge 600 feet above the Dead Sea. A stream of fresh water, originating in an underground spring deep in the Judean Desert, rushes through a steep canyon dense with tamarisk, pine, birch and oleander. We ascend to the top of the canyon, where a cascade tumbles down sandstone cliffs into a cool, clear pool.

Yet not a single drop of that spring water—some 114 million gallons a year—reaches the Dead Sea. Just outside the nature reserve, the Ein Gedi kibbutz takes it, bottling some for a popular brand of mineral water and using the rest to ir-

DAVID BLUMENFELD

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MAKING SENSE OF INVESTING

rigate the kibbutz grounds and botanical gardens, a sea of green amid the desert's desolation. To Bromberg and other environmentalists, kibbutz policy is rank hypocrisy. "The people of the Ein Gedi kibbutz are the first to complain about sinkholes along the shore," Bromberg says. "But they don't blame themselves for contributing to the problem."

Ein Gedi's residents deny any responsibility for the Dead Sea's plight—and lash out both at green groups such as Friends of the Earth and at the Israeli Knesset (Parliament), which recently sought to crack down on the kibbutz's water usage. "It's garbage what they're saying. If you take all water from Ein Gedi's spring, it's a small drop in the Dead Sea," Merav Ayalon, Ein Gedi's spokesperson, told me. "The problem isn't us. It's the Israeli government." Ayalon blames the Water Commission and the Agriculture Ministry for a short-sighted policy that, she says, has wrecked the local economy. "Our date palms are dying because of the sinkholes," she says. "Our farmers can't work [in some groves] because it's gotten too dangerous. People have come close to being killed. We almost had to close the kibbutz, and the government does nothing. It has no policy to save the Dead Sea."

So what is the answer? Environmental activists say that one solution is to eliminate the water subsidies altogether. "Unless water is priced at its real costs," says Ra'ed Daoud, managing director of ECO Consult, a water-use consulting firm, "there's no way you're going to reduce agriculture." But because the region's agricultural lobby is strong and the environmental movement weak, says Daoud, there has been insufficient leverage for change. Israel's water commissioner, Shimon Tal, recently spoke publicly about the need to reduce some subsidies, but he admitted that it would be a long and difficult battle. Even Prime Minister Ariel Sharon, who grows vegetables on his farm in the Negev Desert, likes the subsidies. "We desperately need to change the situation, but the agriculture lobby won't even talk about it," says Tamar Keinan, a former Israeli Water Commission official turned project manager for Friends of the Earth.

Another approach is to encourage alternate water sources. Friends of the Earth Middle East is part of a coalition of 21 environmental groups that has developed proposals to conserve household water use (about 133 billion gallons a year, as much as that used in agriculture) and to regulate the amount that can be taken out of Israel's springs. In addition, the Israeli government is promoting the building of wastewater treatment plants and desalination facilities; the first large one on the Mediterranean was completed this past August. Over the next five years, the government says, these facilities will provide as much as 106 billion gallons of fresh water annually for agricultural and domestic consumption.

Friends of the Earth is also taking its message to the farmers themselves—encouraging them to plant crops that use less water and spelling out the advantages of renewed tourism in the area. "Israeli agriculture is incredibly mismanaged," Bromberg says as we pass banana plantations along the Jordan River bank. "The farmers here could be planting olives, flowers and other crops like dates that don't require fresh water.

On the lake's southern shore, a private company, Dead Sea Works, pumps water into holding ponds where valuable salts and minerals are evaporated, causing yet more depletion.

DAVID SILVERMAN / GETTY IMAGES

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Dead Sea resorts (a hotel in Ein Bekok, Israel) still lure vacationers. Says Bromberg: "The tourist-dollar return of a healthy Dead Sea outweighs the return agriculture offers."

They could be using treated sewage water and allow fresh water to flow back into the Jordan River." Friends of the Earth cites a Haifa University study that argues that current uses of the Jordan River make no sense. "The potential tourism-dollar return of a healthy river and a healthy Dead Sea outweighs the little return that agriculture offers," says Bromberg.

To see the possibilities of tourism for myself, I visit the Gesher kibbutz, which straddles the ancient trade route from the port of Akko and Jerusalem to Damascus and Baghdad. The Romans, Ottomans and British all built bridges over the Jordan at this spot; the spans remained intact until May 1948, when defending guerrillas blew them up partially to prevent 3,000 Iraqi troops from invading the newly declared state of Israel. Last year, the kibbutz put a train car on one of the bridges and restored some buildings in the area, including a 13th-century *khan*, or guesthouse, and an Ottoman-era customhouse, to lure tourists to the site.

But it remains a hard sell. The border zone, where the kibbutz is located, is one of the tensest places in the world—bristling with watchtowers, machine-gun nests and barbed wire. As we head down to the riverbank, Nirit Bagron, my tour guide from the kibbutz, halts before a military security fence covered with sensors that can detect would-be terrorist infiltrators from Jordan. Bagron, who brings tourists here by special arrangement with the Israeli Defense Forces, is quickly checked by Israeli troops and permitted to pass, as am I. As we approach the river, she points out three observation posts perched atop the rugged hills lining the Jordanian side. "They're watching us," she tells me. "We've never talked to them, but sometimes, on a very hot day, we see the Jordanian soldiers go down there to fish and even to swim."

The Jordan River, its mix of untreated sewage and saline runoff flowing below us, courses through a black basalt canyon and under the ancient Roman bridge. Bagron looks down and grimaces. "I wouldn't dive in there, not even on a hot day," she tells me. "It's very bad, bad water."

Uri Schor, the Water Commission spokesman, defends Israel's water policy and says the greens' campaign to put more water back into the Jordan River is misplaced. "These groups think about nothing but the environment, but we have other issues to consider," says Schor. In a country that has faced repeated droughts and shortages, he goes on, nature will always take a back seat to the needs of human beings. "Imagine you are stuck in a desert with one glass of water," says Schor. "You also have a potted plant. What do you do? Do you water the plant? Of course it's a bad thing to dry out the plant, but you have to live too." Schor and other Israeli officials defend the subsidies that support agriculture, arguing that farming is a vital economic and environmental resource for the country. "Agriculture made the desert bloom," says one former official in the Israeli Water Commission. "Imagine Israel without it. It would be a wasteland."

Officials at Israel's Ministry of the Environment say they doubt that the Jordan can ever be replenished. Even with new

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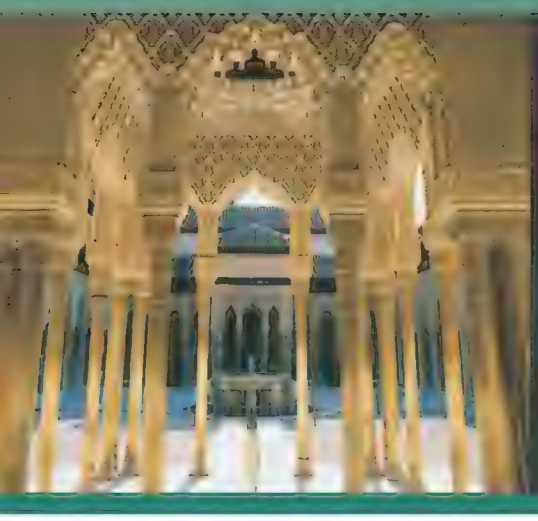
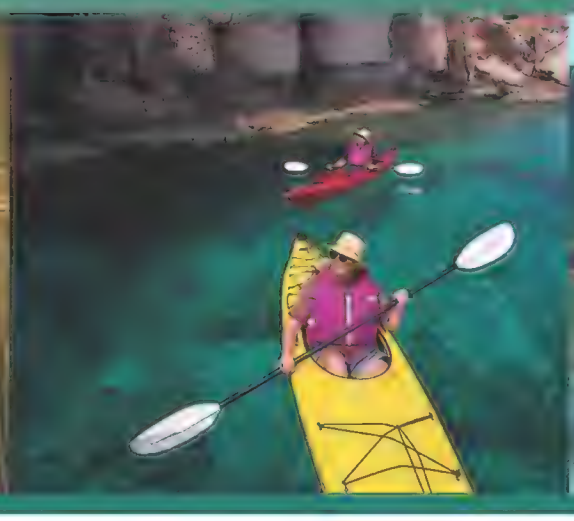

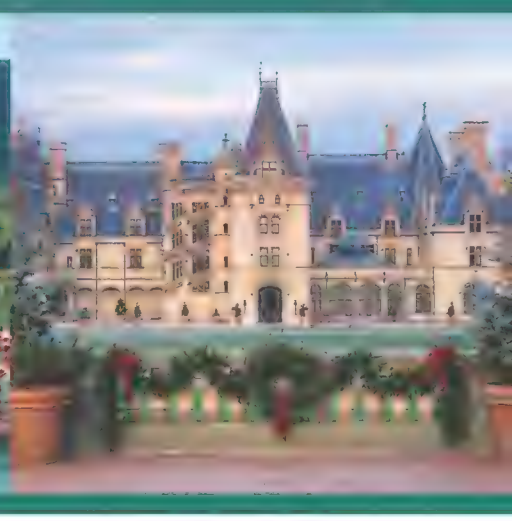

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desalination and wastewater treatment plants, they say, supplies of fresh water will barely keep up with increased demand. "It would be very nice to bring the Jordan River back to where it was 100 years ago, but it's not realistic," says Miriam Haran, director general of the ministry. "We're not the only country using the river. Syria and Jordan are taking out huge amounts of water." Haran cites the report prepared for her government that says the Dead Sea can exist for another century and lose only one-third of its current volume. "We're not talking about the disappearance of the Dead Sea," she says. "The only real problem is these sinkholes, and we'll find ways to deal with them."

DURING THE PAST FOUR YEARS Tayseer al-Smadi, who was until recently director general of Jordan's Ministry of Planning and International Cooperation, was a leading advocate of the so-called Red-Dead project—a proposed 112-mile concrete conduit to carry seawater from the Red Sea to the Dead Sea. First dismissed as preposterous by international lenders and government officials alike, the notion is now taken seriously by Israel, the Palestinian Authority and Jordan. "You can always say, 'Let's go pray that the rainy season will be better next year,' but you can't rely on it," al-Smadi told me. "If we don't do something fast, the Dead Sea is going to die. [Red-Dead] is the only solution."

It's nothing if not ambitious: a six-mile-long canal would carry seawater from the Gulf of Aqaba into giant underground pipes across Jordan's desolate Wadi Araba, a desert area along the border with Israel. The water would be pumped to about 1,000 feet above sea level, then would flow downhill for about 50 miles to the Dead Sea. Some 200 billion gallons of seawater per year would be diverted to the dying sea. The same amount would be desalinated and distributed among Jordan, Israel and the Palestinian Authority. Hydroelectric stations along the route would provide 550 megawatts of power—potentially transforming the regional economy.

Red-Dead began to gather support after the historic 1994 peace agreement signed by Jordan's King Hussein and Israeli Prime Minister Yitzhak Rabin. Three years later, at the request of both countries, the World Bank conducted a preliminary study of the plan, then backed away from financing it because of the high price tag: an estimated $1 billion for the conduit, plus another $3 billion for hydroelectric power stations and desalination plants. After languishing for years, the project regained momentum at the 2002 Conference on Sustainable Development in Johannesburg, South Africa. Israel, wanting to curb attacks by Palestinian suicide bombers, had just invaded the West Bank, and as anti-Israeli protesters filled Johannesburg's streets, Jordan's minister of planning proposed the idea of a "Peace Conduit" to his Israeli counterpart. This time, the World Bank was cautiously receptive. Following discussions between then World Bank president James Wolfensohn and Jordan's King Abdullah, the bank agreed to coordinate a $15 million study once Jordan, the Palestinian Authority and Israel agreed on mutually acceptable "terms of reference." (The three did so this past May.) Bromberg says there's tremendous pressure on the World Bank to support Red-Dead because "it's the only joint project between Jordan and Israel to come out of the Palestinian intifada."

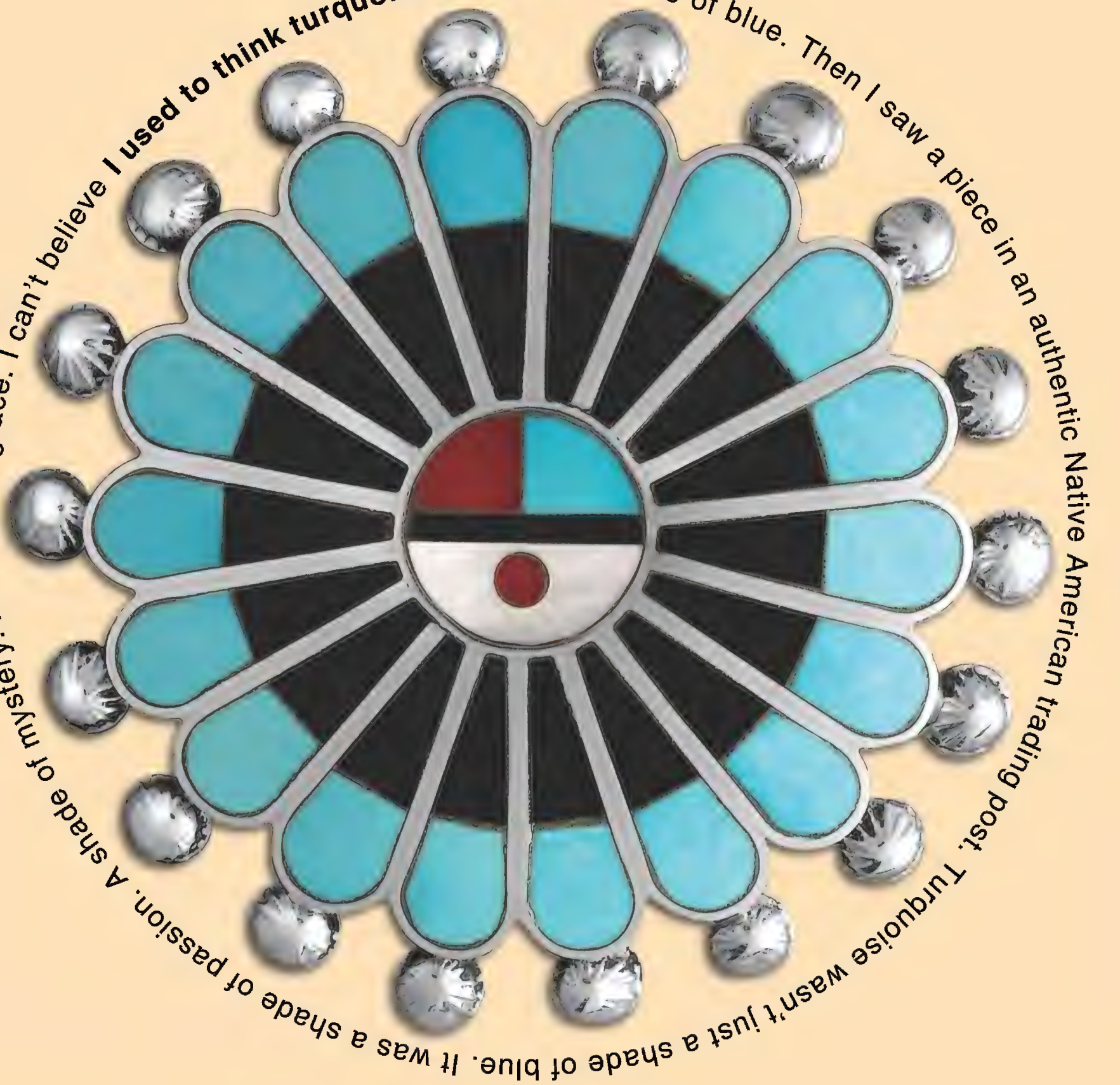
Drastically reduced: Satellite images show that in 40 years, the Dead Sea has receded to two-thirds its original size.

Many questions, and hurdles, remain. One of the biggest concerns is the potential effect of introducing seawater from the Gulf of Aqaba into the Dead Sea's brine. Will the sea lose its fabled buoyancy? Will dilution produce algae, which could change its color from turquoise to brown? Will mixing affect its rich mineral content? And there are thorny political issues as well. Israel, Jordan and Palestine have provisionally agreed that all three would benefit equally from the undertaking, but that remains to be seen. "This is a massive project whose impact has to be looked at very closely," says ECO Consult's Ra'ed Daoud. "We're not just building a chocolate factory here." He believes that it will be at least five years before any digging begins. Bromberg, citing cost and potential destruction to the environment, is more pessimistic. "We're very skeptical that this canal will ever be built," he says.

But what is the alternative? According to a recent study by the Technion-Israel Institute of Technology in Haifa, the Jordan could run dry within the next few years, as more dams are built on its tributaries and more raw sewage is recycled through new wastewater treatment plants in Israel, rather than dumped into the Jordan River. "We've gone from a point, five years ago, where nobody except environmentalists cared about the fate of the Dead Sea, to a point where all three governments say they value the Dead Sea and recognize that they have to rehabilitate it," Bromberg said. "But when it comes to stopping the diversion of all the water of the Jordan River, there has been zero progress."

Time is running short. Late one afternoon, Bromberg and I drive up the mountainous coast to view what could turn out to be a window into the future: an abandoned luxury hotel, built by Jordan decades ago on what used to be the Dead Sea's northern shore. After walking up a weed-choked path, we step into a marble-floored lobby, now a crumbling ruin. The wide veranda, decorated by faded murals depicting maps of the Jordan River Valley, looks out over a cracked, deserted swimming pool. "This place was once the fanciest hotel on the Dead Sea—and then it was left in the dust," Bromberg says. A mile away, across an arid moonscape, I can barely make out the glittering blue edge of the Dead Sea, receding a bit more every day.

NASA (2)


I used to think turquoise was just a shade of blue. Then I saw a piece in an authentic Native American trading post. Turquoise wasn't just a shade of blue. It was a shade of passion. A shade of mystery. A shade of grace. I can't believe

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It was essential for Matisse (in 1928 at his studio in Nice with a model named Zita) to begin work by finding the pose that made a new model feel most comfortable. "And then," he said, "I become the slave of that pose." His 1921 *Odalisque in Red Culottes* (opposite) was the first of his paintings to be purchased by the French state.

Matisse
AND HIS MODELS

The author of a new biography of the artist argues that the women he painted were full partners in the creative enterprise

BY HILARY SPURLING

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In September 1940, less than three months after Paris had surrendered to Hitler's armies, artist Henri Matisse, stranded in Nice on the Mediterranean coast, sent a moving letter to his younger son, Pierre, in New York City, explaining why he now needed a model to paint more than ever. France was humiliated and defeated. Like millions of other citizens driven from their homes by the German invaders, Matisse had fled south, taking no more than he could carry, living precariously from one day to the next, and ending up in Nice, where a nervous population expected imminent invasion by Fascist Italian troops.

Matisse was 70, sick, helpless, fearful for his family and friends, and appalled by what had happened to his country. All he could do was work, but he said he dreaded the daily confrontation with form and color on canvas so much that he couldn't face it without the consoling human presence of the pretty young film extras he paid to pose for him. "That's what keeps me there, surrounded by my fruit and flowers which I get to grips with little by little, almost without noticing . . . and then I wait for the thunderbolt that is bound to follow."

The French expression for thunderbolt—*coup de foudre*—means "love at first sight," with all the undertones of violence and risk that were an intrinsic part of Matisse's passion for painting. Anxiety and dread hung over his studio sessions. Toward the end of his life he told an interviewer that each canvas began as a flirtation and ended up as a rape. He said it was himself, not his subject—or rather it was the feelings his subject aroused in him—that had to be raped. The subject itself could be fruit, flowers or a fabric screen, as often as a human sitter. The young women who posed for him all learned to live and work in the atmosphere of almost unbearable tension generated by Matisse's effort to express his emotions on canvas—an effort that drained all his strength.

It was precisely his aura of desperation and danger that had first attracted Matisse's wife, Amélie, who posed for or presided over every one of the great revolutionary canvases he produced in the first years of the 20th century. "As for me, I'm in my element when the house burns down," she said coolly, in response to the howls of outrage provoked by her husband's work. The riotous colors of his *Woman in a Hat* and *Portrait of Madame Matisse* (opposite), both painted in 1905, unnerved contemporaries. His notorious *Blue Nude*—a fiercely distorted picture of Amélie reclining in a sunlit glade beneath palm fronds—seemed grotesque and obscene when it was first shown in Paris in 1907. Even to Matisse's faithful supporter, the young American critic Walter Pach, it felt like a punch between the eyes.

Matisse's reputation as a Modernist leader was built on this sort of shock. So his followers saw it as an unforgivable betrayal when he moved from Paris to Nice ten years later and started painting good-looking young women in transparent tops and harem pants lounging on cushioned divans. "He's given in, he's calmed down, the public is on his side," Matisse's friend, politician and collector Marcel Sembat, wrote in disgust when the French state bought *Odalisque in Red Culottes* in 1922. Sembat's view of Matisse at this stage as an essentially frivolous and decorative lightweight would set the tone of response to his work for decades to come. It was useless for Matisse himself to

The out-of-wedlock daughter of Matisse and Camille Joblaud, Marguerite (left, in 1907, with the artist and his wife, Amélie), was 5 years old when she came to live with the couple in 1900. Matisse taught his daughter to paint, and she often posed for him, as in the radical *Girl with Black Cat* (below), 1910.

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Biographer HILARY SPURLING *is the author of* The Unknown Matisse *(1998) and* Matisse the Master *(2005, Alfred A. Knopf).*

"Expression, for me," wrote Matisse, "does not reside in passion bursting from a human face. . . . The entire arrangement of my picture is expressive." His 1905 painting of Amélie—*Portrait of Madame Matisse* (a.k.a. *The Green Line)*—was one of the works that earned him the nickname "Fauve," or "Wild Beast." One critic said of it: "He makes you see her in a strange and terrible aspect."

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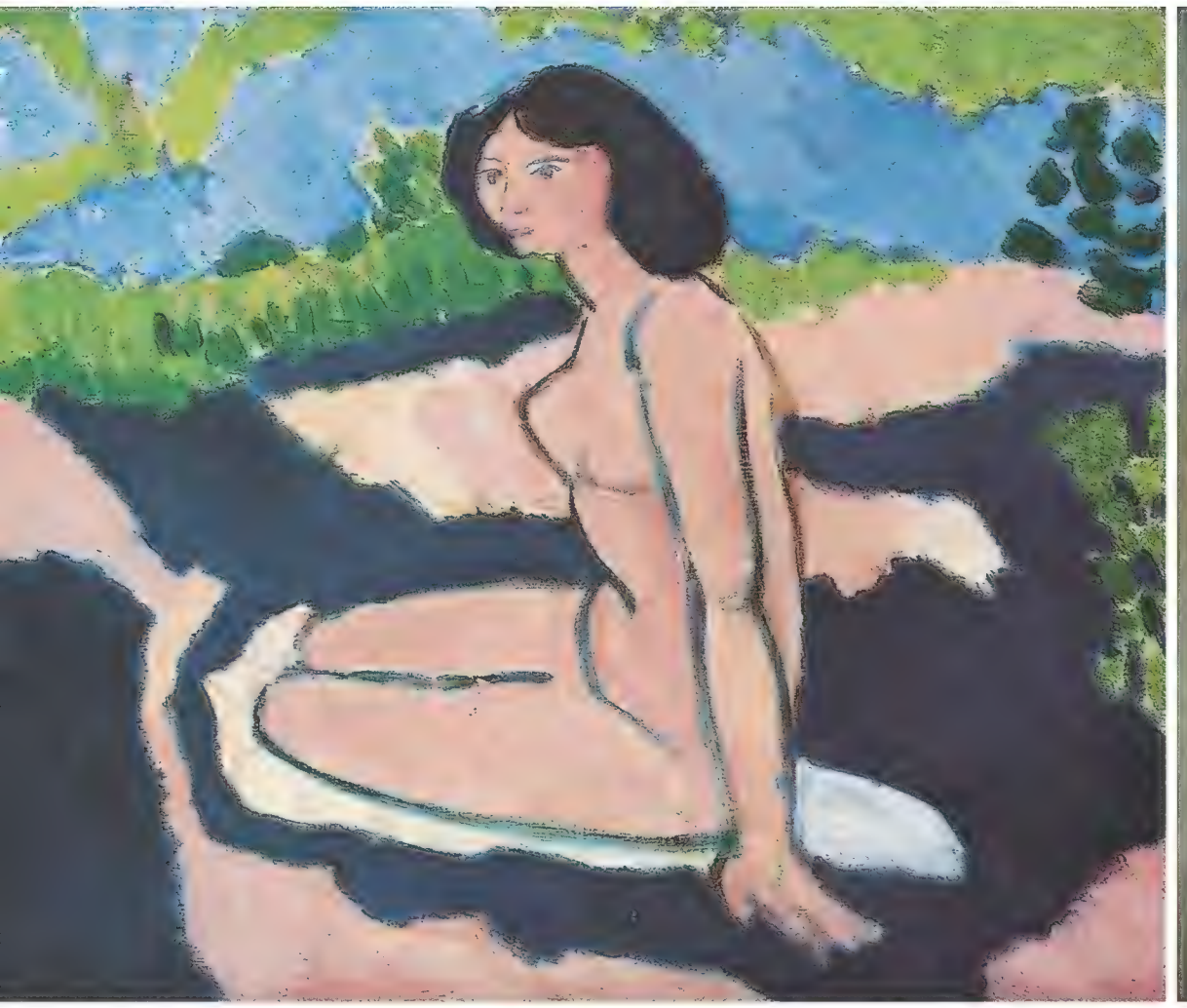

Loulou Brouty posed for *Seated Nude* (above, left) in 1909. "I wasn't just trying to paint a woman," Matisse said of the work. "I wanted to paint my overall impression of the south." *The Italian Woman*, 1916 (above, right) was the first of 50 paintings Matisse did of the model Lorette. In *The White Plumes* (below), from 1919, Antoinette Arnoud wears the hat that Matisse made for her.

protest that his odalisque paintings of the 1920s and '30s were a series of chromatic experiments, a long, grueling preparatory phase without which he could not have produced the astonishing cut-and-painted paper compositions constructed directly from color in the last decade of his life. The conventional verdict dismissed him, at the time and afterward, as a kind of 20th-century Fragonard, turning out sexy pictures for rich men's Manhattan apartments and villas in the south of France.

Matisse himself knew perfectly well that the erotic charge in his work came from a passionate desire that overrode straightforward lust. It was painting itself that seduced him over and over again with each fresh canvas. In old age when he was too weak to stand all day at the easel, he feared going blind as well "because of having flirted for too long . . . with these enchanted colors."

All his life Matisse drove his models as well as himself to the limits of endurance. He insisted it was better to risk ruining a painting than be satisfied with a surface likeness. It's always necessary to force your whole being beyond this stage, he told his daughter, Marguerite, because it's only then that you start to make discoveries, and tear yourself apart in the process.

Matisse paid with insomnia and panic attacks for his inability ever to be satisfied with what he could already do. The models were generally exhausted, sometimes mutinous, often apprehensive in the early years, when they had to come to terms not only with public ridicule but with their own private misgivings. Even the boldest, Matisse's student Greta Moll, was horrified to find her features discolored and her limbs distorted on Matisse's canvas. Amélie herself wept in distress when she saw the last painting he ever made of her, the grave and beautiful *Portrait of Madame Matisse* of 1913, with stony black eyes set in a delicate masklike gray face.

It took courage to pose for the extraordinary portraits Matisse made before World War I: *The Girl with Green Eyes*, *The Algerian Girl*, *Girl in Green*, *Girl with Black Cat*. The confident gaze and frank body language of these young women, painted almost a century ago, speak directly to us today, although contemporaries could see little in these portraits but meaningless jumbles of color outlined in ugly black brushstrokes. The sitters included the painter's then teenage daughter, Marguerite (always one of his favorite models), and two of his students. But the one he returned to most often was a professional model named

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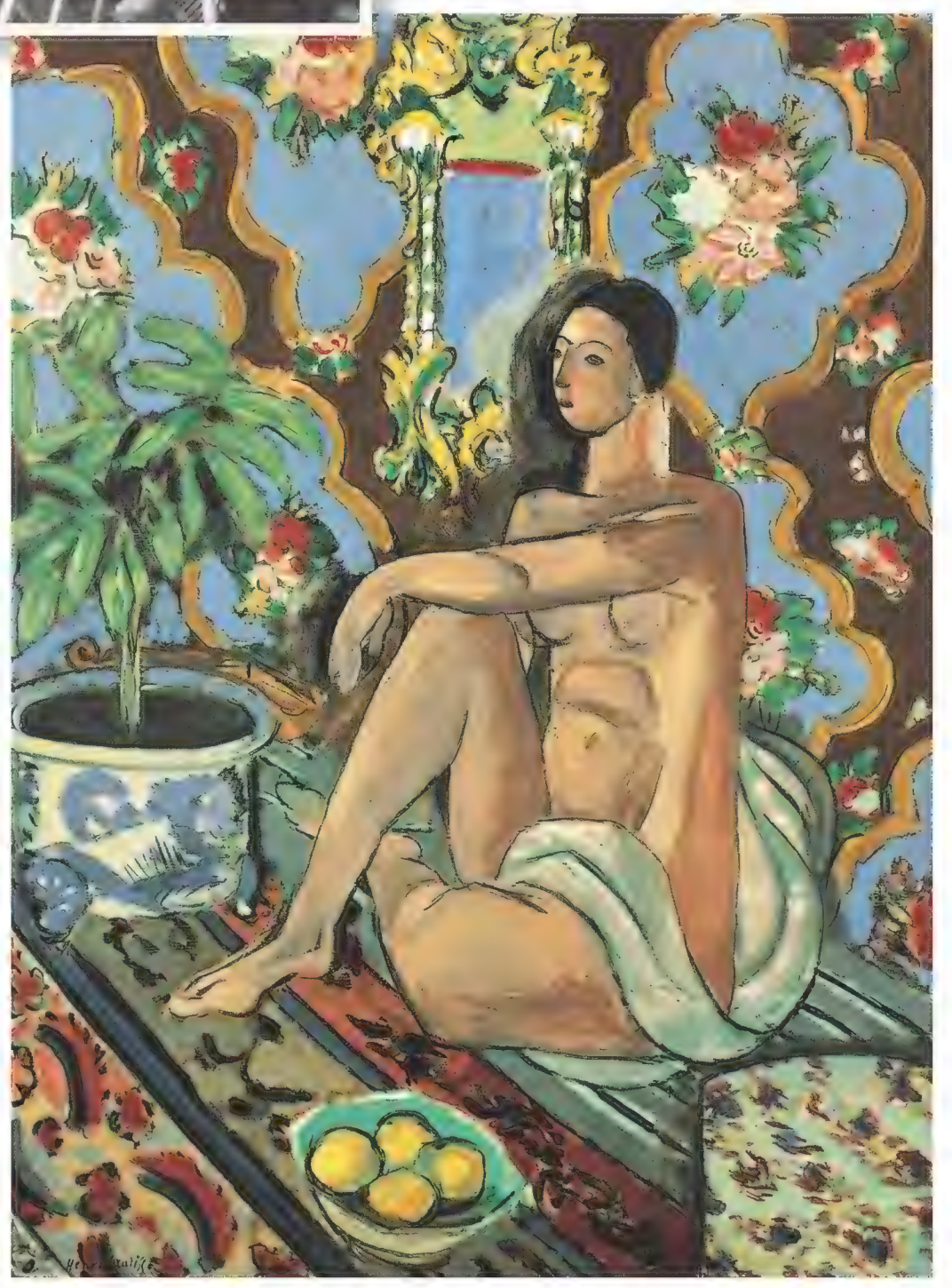
Loulou Brouty, who spent a whole summer with the Matisses in a remote Mediterranean fishing village in 1909. The entire family liked Brouty. She amused the children (Marguerite, Jean and Pierre), was company for Amélie, and took swimming lessons from Henri between painting sessions. She was a typical Parisienne, earthy and tough, with dark hair, catlike features, a lithe body and skin so richly tanned by summer's end that Matisse's pupils nicknamed her "the Italian sunset."

The pictures he painted of Brouty startled everyone, including the painter himself. Marcel Sembat and his wife bought one of them, a seated nude that made them scream out loud the first time they saw it. "We had come across a strange little canvas," wrote Sembat, "something gripping, unheard of, frighteningly new: something that very nearly frightened its maker himself. On a harsh pink ground, flaming against dark blue shadows reminiscent of Chinese or Japanese masters, was the seated figure of a violet-colored woman. We stared at her, stupefied . . . all four of us." Sembat said afterward that the picture only made sense once you stopped trying to read it as a conventional nude and responded instinctively to the sensations of dazzling light, heat and shade conveyed by its patchwork of colors. "You see, I wasn't just trying to paint a woman," Matisse explained. "I wanted to paint my overall impression of the south."

The story illustrates exactly what Matisse meant when he said he needed a model to humanize the ordeal of painting. In 1905 it was his wife who stared calmly out from conflagrations of blazing color on canvases that looked to the public and critics like the work of a wild beast. In 1909 it was the sturdy, self-possessed Brouty who pointed the way to a new visual language that would lead eventually to the somber, powerful, semiabstract works Matisse produced at the height of the carnage during World War I. Toward the end of the war, when he had gone as far as it was possible to go at that stage toward abstraction, he turned to another professional model, this time an Italian called Lorette.

There was nothing in the least alluring about *The Italian Woman,* Matisse's first painting of Lorette, with her hollow cheeks, sticklike bare arms and cheap, flimsy blouse. The picture's geometrical construction of black lines and curves somehow emphasized the touching pathos of this sad and wary hired model, dressed in an outfit hopelessly unsuited to the freezing temperatures of a Paris winter. *The Italian Woman* was the last of a series of canvases in which Matisse had stripped painting down to its purest and most austere form. Now he was restless, and ready to throw off the constraints of abstraction. It was at this point that Lorette's professional training as a model kicked in to liberate both of them. She adored dressing up, switching from waiflike innocence to sumptuous abandon, seeming to change mood, age, even size, as readily as she tried on costumes. Matisse painted her as a flirtatious Spanish *señorita* in a lace mantilla, a turbaned inhabitant of a Turkish harem and a Parisian cocotte.

He responded to Lorette's lead as spontaneously as a dancer taking to the floor, painting her energetically from odd angles in strange perspectives, and improvising endlessly inventive rhythmic variations on the central theme of her strong features, heart-shaped face and black hair. Their re-



The culmination of Matisse's seven-year working partnership with model Henriette Darricarrère (left, with the artist in 1921 at his studio in Nice) was his 1926 *Decorative Figure on an Ornamental Ground* (below).

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lationship set a pattern for his future partnerships with models, each of which took on the obsessive intimacy of a love affair played out on canvas. Matisse painted Lorette nearly 50 times over a period of 12 months, breaking off only when he moved his workbase from Paris to a hotel in Nice in 1918.

It was over a year before he found anyone to take Lorette's place in the provincial resort of Nice, where prospective models were so rare that painters had to wait in line for their services. Antoinette Arnoud was 19 years old, pale and slender, with worldly tastes and an inborn sense of French chic. Matisse responded to her love of style with a hat that he made himself from a cheap straw base with a white ostrich plume curling over the brim. Arnoud wore the new hat with a panache that made her simple white housecoat seem like a ball gown.

Daily painting sessions alternated with hours on end devoted to drawing. Matisse set himself the almost impossible task of retaining the concentrated simplicity and force of his work without sacrificing the sensual texture of fur, feathers, fabric or fluff. He returned over and over again to a lace collar, drawing it in minute detail ("each mesh, yes, almost each thread") until he had got it by heart and could translate it at will with two swift lines "into an ornament, an arabesque, without losing the character of lace, and of that particular lace," he once said. The same process was repeated with her embroidered tunic, hat, hair, hands and face. Energy pulses between the lines of the letters Matisse wrote home from the small hotel room in Nice where he lived, slept and worked, having finally succeeded in narrowing his existence down to painting alone. "I'm the hermit of the Promenade des Anglais," he announced with pride to his wife.

For the public, the quality of Matisse's pictures at this stage was more or less completely obscured by the lifestyle they depict. *French Window at Nice* shows Arnoud, with bare legs, long loose hair and scarlet harem pants, seated beside the bed in the painter's hotel room. People drew the obvious (but as it now turns out, erroneous) conclusion from the fact that Matisse posed the young girls who sat for him in the 1920s amid all the trappings of an affair, endlessly painting one or another of them wearing a slip at the dressing table, half-dressed in a wrapper over a pot of coffee or newly emerged from the bath.

Matisse photographed Lydia Delectorskaya—his model, secretary and companion for the last two decades of his life—in 1937 in Nice (right), wearing the dress she posed in for *Woman in Blue* (below).

The painter himself said that these Nice interiors are suffused with sublimated sexual pleasure. He claimed that the intensity of his feelings discharged itself through the colors and forms orchestrated on canvas around the models' bodies, and the evidence suggests this was true. In all the weekly, sometimes daily letters he exchanged during these years with his wife and children, there is nothing to suggest tension on this score, neither defensiveness on his part nor resentment on theirs. Matisse and his wife treated the succession of models in Nice as adoptive daughters. No one who knew him well at the time ever doubted that these women were working partners, not sexual conquests.

Sex, in fact, was one of the things Matisse grumbled about having to do without in Nice. So far as modeling went, he applied the same rules to human beings as to a fish dinner. "I've never sampled anything edible that had served me as a model . . . ," he explained, describing a plate of oysters brought for him to paint from a nearby café by a waiter, who later fetched them back to serve to his customers at midday. Matisse said it never occurred to him to tuck into his oysters for lunch: "It was others who ate them. Posing had made them different for me from their equivalents on a restaurant table."

The same seems to have been true of the models for his odalisque paintings of the 1920s. The first of these odalisques—sprawling in "harem costumes" on improvised divans—was Antoinette Arnoud's successor, Henriette Darricarrère, who was working as an extra when Matisse spotted her in the film studios in Nice. He liked her

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Lydia posed for *Pink Nude* nearly every day for six months in 1935. Matisse's son Pierre, who ran a New York City gallery, said his father had renewed himself as an artist with this work.

natural dignity, the graceful way her head sat on her neck and, above all, the fact that her body caught the light like a sculpture. A ballet dancer and musician, Henriette became part of the family in the seven years she worked for Matisse. His wife grew especially fond of her, and he himself taught her to paint.

Matisse said it was essential to start by finding the pose that made any new model feel most comfortable. Henriette's specialty was discovered by accident after a carnival party attended by Matisse and his daughter, dressed respectively as an Arab potentate and a beauty from the harem. Marguerite Matisse, Lorette, even Antoinette Arnoud, all tried on turbans and embroidered Moroccan tops, but it was Henriette, always modest, even prim, in her street clothes, who wore the filmy blouses and low-slung pants without inhibition, becoming at once luxuriant, sensual and calmly authoritative.

The pictorial possibilities she opened up for Matisse were enhanced by her exceptional sensitivity and stamina. He saw the work they produced together as an increasingly complex orchestration of colored light and mass, culminating in his *Decorative Figure on an Ornamental Ground*, which was almost as incomprehensible in 1926 as the *Blue Nude* had been nearly 20 years earlier. The painting is a riot of exuberant *trompe l'oeil* wallpaper, flowers, fruit and patterned textiles, all pinned firmly in place by the pale upright figure of Henriette. She looked as impersonal and unyielding as a side of packaged butcher's meat to Matisse's friend, the painter Jules Flandrin, who was baffled and exhilarated in equal measure: "I can't begin to convey the brilliantly successful contrast between the wallpaper flowers and the woman so skillfully mishandled," he wrote to a friend. Soon after the completion of *Decorative Figure*, Henriette left to get married.

OVER THE NEXT eight years Matisse gradually abandoned easel painting, experimenting with prints, inventing cut-paper techniques and working on large-scale decorative murals, until the advent of a new model in 1935. She was a Russian named Lydia Delectorskaya, and by her own account she could hardly have been more different from the dark-eyed, black-haired, olive-skinned southern types he had preferred until now. Lydia, who came from Siberia, had long golden hair, blue eyes, white skin and finely cut features: the looks of an ice princess, as Matisse said himself.

Born in 1910, the only child of a doctor (whom she adored), Lydia had been orphaned and forced to flee Russia in the turmoil after the 1917 revolution, ending up a penniless exile in Nice. She was surviving precariously on nothing but her pride, her resourcefulness and her unbudgeable will

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"He knew how to take possession of people and make them believe they were indispensable," Lydia (posing for the artist c. 1942-43 in his studio in the south of France) said of Matisse.

when, in 1932, she found temporary work, first as a studio assistant, then as a domestic, with Matisse and his wife. It was not for another three years that the painter asked her to sit for him. Lydia was 25, Matisse was 65. She thought of him as a kindly and polite old gentleman because (unlike previous artists, who had taught her to detest modeling) he never pawed at her or tried to take off her clothes. "Gradually I began to adapt and feel less 'shackled,'" she wrote, " . . . in the end, I even began to take an interest in his work."

The first paintings Matisse made of Lydia combined the phenomenal virtuosity that had cost him so many years to perfect with his original instinctive ability to compose spontaneously in color. Matisse's son Pierre told his father that he had renewed himself as a painter with *Pink Nude*, for which Lydia modeled over a period of six months in 1935.

That autumn Lydia posed for a drawing of a nymph being wooed by a satyr, a theme Matisse had first painted some 30 years earlier, when, as she said herself, his handling was far more brutal than in the variation he did of her. "With me, he knew how to be gentle and seductive. He was charming, and so touching. He knew how to tame me." Matisse said he came eventually to know her face and body by heart, like the alphabet. The collaboration they established together gave Lydia a new sense of power and purpose. As she added the duties of studio manager to those of principal model, painting became the central core of her life as it was of Matisse's.

It was their working alliance, rather than any question of adultery, that precipitated a crisis in Matisse's marriage. Faced with an ultimatum from Amélie ("It's me or her"), Matisse chose his wife and sacked Lydia, but it was too late. Amélie, still furious over what she viewed as his betrayal, left her husband early in 1939. Lydia, returning briefly to help out in the studio in Paris, found herself trapped with Matisse in a stream of people fleeing invasion after the declaration of war with Germany. "A decision had to be made there," she said, "as to whether or not he was to take me with him." Matisse drew Lydia in her traveling hood at the start of the long journey they were about to make together through war-torn France. She remained at his side for the rest of his life.

Visitors to Matisse's studio never tired of speculating about the role of the beautiful, enigmatic secretary known as "Mme Lydia," but few doubted that his survival depended on her, both as a man and an artist. In his closing decade in the face of exhaustion and failing health, Lydia made it possible for him to produce his final masterpieces—the chapel at Vence and the colored paper cutouts now generally agreed to be among the greatest inventions of the 20th century.

Matisse died on November 3, 1954. He was 84. The day before, Lydia had come to his bedside with her newly washed hair wound in a towel turban, accentuating the classical severity and purity of the profile Matisse had so often drawn and painted. He sketched her with a ballpoint pen, holding the last drawing he ever made out at arm's length to assess its quality before pronouncing gravely, "It will do."

HENRI CARTIER-BRESSON / MAGNUM PHOTOS

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A veteran photographer shows the extraordinary knack that some animals have for . . . disappearing

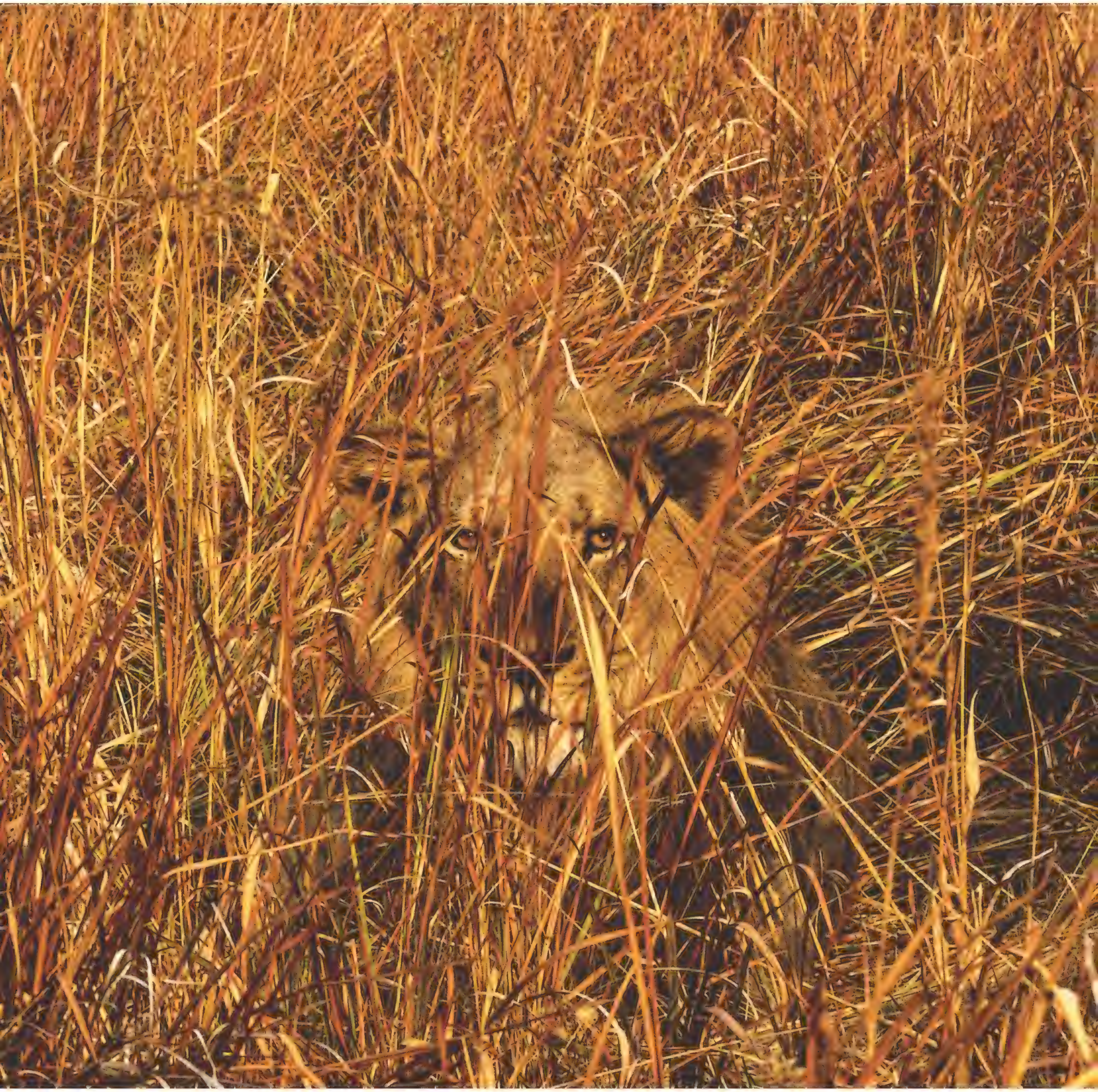
BY LAURA HELMUTH / PHOTOGRAPHS BY ART WOLFE

HIDING IN PLAIN SIGHT

THE WILDLIFE photographs that make us ooh and aah usually depict dramatic action. A lion digs its teeth into a zebra's neck, buffaloes stampede through a cloud of dust, a pair of cranes strut out a mating dance—we like our animals highlighted at their most furious, frightened or amorous.

That's rarely how they appear in nature, of course. Most of the time, they're just trying to blend in. Photographer Art Wolfe, 53, has more than 60 books and plenty of wildlife action shots to his name, but in a new book, *Vanishing Act*, he defies conventions to show what he calls "animals' incredible ability to vanish in plain sight." In these photographs (taken in Kenya, South Africa, Panama, Malaysia and 21 other nations), the animals typically appear in the corner of the frame rather than the center, and some are partly obscured by plants. He further helps the subjects get lost by making both the foreground and background sharp. "Basically, I'm teasing the audience," he says.

Ever since people thousands of years ago noted the uncanny trickery of animal camouflage, nature watchers have taken pains to understand it. Some animals' color matches their favored habitat: plovers that feed in wet sand and muck have darker-brown backs than plover species that spend their time in dry, lighter-colored sand



dunes. Some animals coordinate their look with the seasons, shedding dark fur or molting dark feathers once the snow flies. Certain sea creatures tint their skin with pigments from the corals they've eaten to take on the color of their home reef.

Somewhat counterintuitively, vivid splotches or stripes help protect animals such as zebras and giraffes. Stripes can distract a lion—which is susceptible to visual illusions like the one we experience when we can't decide whether a picture shows a vase

Protecting prey or hiding hunters, cryptic coloration shows up throughout the animal kingdom. On pages 82 and 83, a lion waits in South Africa. These pages, clockwise from top right: a giraffe in South Africa; a Gaboon viper in Tanzania; a northern spotted owl in Washington State; an orchid mantis in Malaysia; and a harp seal in Quebec.

or two faces— from recognizing the outline of the zebra's body. (What works for animals works for people too. Military camouflage, first introduced in World War I, was inspired by research on animal camouflage.)

Mimicry is the shrewdest disguise. Mantises, shaped like flowers, devour insects that fly in to pollinate mock blossoms. A copperhead twitches the tip of its worm-like tail to lure hungry frogs. And tasty viceroy butterflies are safe from birds because they resemble monarchs, which are unpalatable.

Some camouflage works in concert with particular behaviors. When a bittern, a marsh bird, is startled, it sticks its long neck and bill straight up and displays its vertically striped feathers, looking for all the world like a patch of reeds. Just this year, scientists reported that an octopus that lives in the Pacific Ocean off Australia walks along the seafloor with two arms, gently waving the other six so that it resembles a rolling clump of algae.

The modern study of camouflage began shortly after Charles Darwin proposed, in 1858, that new species arise through evolution by natural selection. He recognized that there are variations among individual members of a species, with some individuals being stronger or faster or better camouflaged. If an inherited trait helps an individual survive in a given environment, and reproduce, the trait will be passed on to future generations. If enough new traits accumulate in a group over time, a new species emerges.

Some of the first experimental evidence for Darwinian evolution came from research on camouflage, which is an easily studied adaptation—a trait that makes an animal more fit to survive in a particular habitat. Nearly a century ago, scientists dropped house mice into enclosures of various colors and found that owls snatched fewer mice from backgrounds that matched mouse fur. Likewise, researchers put mosquitofish in light or dark containers, waited for the fish to acquire light or dark coloration, then put them into different-colored containers overseen by hungry penguins. Fish that blended in fared better, while those that stood out were better fare.

Those experiments and others helped demystify evolution by vividly demonstrating how predators do its work, naturally selecting which mice or fish or other living thing survives in which environment. Thousands of studies have bolstered Darwin's revolutionary discovery. Today, researchers are identifying particular gene sequences that can make an animal inconspicuous. But even now, one of the best ways to appreciate evolution is to notice how well camouflage tricks your own eye.

Below: a Panamanian Golden Frog, poisonous to eat, brightly displays its inedibility. Opposite: a Von Höhnel's chameleon turns bark-like in Kenya.

LAURA HELMUTH is a senior editor at SMITHSONIAN. *Photographs from* Vanishing Act *by Art Wolfe, copyright ©2005 by Art Wolfe, by permission of Bulfinch Press, Time Warner Book Group.*

THE GLORY THAT IS

Thanks to renovations of its classical venues, the Eternal City has never looked better

BY TONY PERROTTET
PHOTOGRAPHS BY MASSIMO SIRAGUSA

CLIMBING THE CAMPIDOGLIO, or Capitoline Hill, which has lured visitors to Rome since the days of the Caesars, still provides the best, most inspiring introduction to this dynamic city. This was the most sacred of antiquity's seven hills, and in the Imperial Age (27 B.C.-A.D. 476) the Temple of Jupiter graced its summit. One of the travelers who made a pilgrimage to this spot over the centuries was the young Edward Gibbon, who, on an autumnal evening visit in 1764, was shocked by how little survived from Imperial Rome. Surveying the melancholy ruins "while the bare-footed fryars were singing Vespers," he was then and there inspired to write his monumental history, *The Decline and Fall of the Roman Empire.*

In his masterwork, Gibbon took as his starting point Rome at the height of its glory, in the second century A.D., when the Capitoline Hill was a symbol of the city's eternal power and the Temple of Jupiter a stunning sight. Beneath the temple's gold-plated roof, an immense gold-and-ivory statue of the king of the Roman gods presided over artworks from around the known world. But it was the spectacular view that hypnotized. From the Campidoglio's exalted heights, ancient travelers gazed at a rich urban tapestry below. Rome was the largest metropolis the world had ever seen, and its marble structures, the Greek orator Aelius Aristides observed around A.D. 160, covered the horizon like snow.

Today, the Campidoglio is dominated by the renovated Capitoline Museums, twin Renaissance palaces facing a piazza designed by Michelangelo. The oldest public museums in the world, their gleaming hallways are lined with classical masterpieces such as the Etruscan bronze *She-Wolf* suckling the twins Romulus and Remus, the symbol of the city, and

One of Rome's seven hills, the Campidoglio was crowned in antiquity by the Temple of Jupiter and served as the city's religious and political center. Today it is the site of the Capitoline Museums, the oldest public museums in the world (a crowd gathers for a concert on Michelangelo's piazza).

the marble *Dying Gaul* and *Capitoline Venus*. And while the Temple of Jupiter was razed by looters in the fifth and sixth centuries A.D., its site has once again become an imperative destination for Italians—as the Eternal City's most spectacular outdoor café. Standing on its rooftop terrace and gazing across Rome's fabled red-tiled roofs at sunset, foreigners and locals alike congratulate themselves on being in the most beautiful metropolis on earth—just as they did 2,000 years ago. "Rome in her greatness!" wrote the poet Propertius in the age of Augustus Caesar. "Stranger, look your fill!"

A new spirit is alive in all the classical venues of Rome, once notorious for their apathetic staff, erratic schedules and lack of display labels. Some favorites had been closed for decades; even at the Capitoline, visitors never knew which rooms would be open or what exhibits buried in storage. Now Roman museums are among the most elegantly designed and its archaeological sites the most user-friendly in the world. "Compared to Rome in the mid-1980s, the improvement is incredible," says archaeologist Nicola Laneri, 35. "And there is another big change: it's not just foreign tourists who are taking advantage of the cultural improvements. A huge number of Italians are now visiting them."

In fact, Rome is enjoying a new age of archaeology—the third in the city's modern history. The first occurred in the 1870s when Rome became the capital of a newly unified Italy and King Victor Emmanuel II ordered the Colosseum and Forum cleared of rubble. Then in the 1920s and '30s, Mussolini tore up much of central Rome and exposed the port of Ostia, the city's main seaport in antiquity, as part of his campaign to gain popular support for his misguided ventures (although he destroyed almost as much as he saved). The current, more scientific effort began in the 1990s, powered by funds to spruce up the city for the Grand Jubilee millennial festivities in the year 2000. Not only did the jubilee put unprecedented millions of dollars into renovations, but it sparked contentious municipal, national and Vatican bureaucracies to complete several long-dormant projects. "The jubilee was a huge catalyst for change in Rome," says Diane Favro, professor of architecture at UCLA, who is working with University of Virginia professor Bernard Frischer to create an interactive digital model of the Roman Forum that will allow a virtual walk-through of the site. "Paired with the digital revolution, there's been a huge leap forward in our understanding of the ancient city."

Although arguments over funding of the sites continue unabated, the resurgence of interest in the ancient past shows little sign of waning. Last month Italian officials unveiled a magnificent 28-foot-high sacrificial altar dedicated by the emperor Augustus in 9 B.C. to celebrate the advent of the Pax Romana. (Called the Ara Pacis, or Altar of Peace, the famous monument, first excavated in the early 20th century and later restored by Mussolini's archaeologists, has been under a protective covering for six years while a new museum pavilion to hold it, designed by American architect Richard Meier, was under construction. The pavilion, with exhibits, a library and an auditorium, is scheduled to open next year.) Responding to popular demand, Rome's once-secretive Archaeological Superintendency now posts the latest discoveries on the Internet. New digs are followed closely in the Italian press and discussed avidly in cafés.

All this renewed fervor has historical symmetry: ancient Romans were also passionate admirers of their own city, says Favro, and they joined hordes of provincial tourists trooping from one monument to the next.

In fact, Imperial Rome was designed specifically to impress both its citizens and visitors: the first emperor, Augustus (27 B.C.-A.D. 14), began an ambitious beautification program, which led to one glorious edifice after another rising above the confusing welter of tenements. It was under Augustus that Rome first began to look like a world capital: its splendid monuments hewn from richly colored marble were, Pliny the Elder wrote in A.D. 70, "the most beautiful buildings the world has ever seen." With the completion of the Colosseum in A.D. 80 and Emperor Trajan's massive Forum in A.D. 113, the image of Rome we carry today was virtually complete. With more than one million inhabitants, the megalopolis had become the greatest marvel of antiquity: "Goddess of continents and peoples, Oh Rome, whom nothing can equal or even approach!" gushed the poet Martial in the early second century A.D.

In 1930, Sigmund Freud famously compared modern Rome to the human mind, where many levels of memory can

It was the view from the Campidoglio (opposite) that inspired Edward Gibbon, in 1764, to write his monumental history of Rome. Architect Richard Meier's controversial pavilion to house the Ara Pacis (above) has been compared to "a gas station in Dallas."

ALL, MASSIMO SIRAGUSA / CONTRASTO / REDUX PICTURES

TONY PERROTTET is the author of Pagan Holiday: On the Trail of Ancient Roman Tourists. *His last story for* SMITHSONIAN *was about Little Bighorn.* MASSIMO SIRAGUSA *is based in Rome.*

coexist in the same physical space. It's a concept those classical sightseers would have understood: the ancient Romans had a refined sense of *genius loci*, or spirit of place, and saw Rome's streets as a great repository of history, where past and present blurred. Today, we can feel a similarly vivid sense of historical continuity, as the city's rejuvenated sites use every conceivable means to bring the past to life.

Imaginative links to history are everywhere. The ancient Appian Way, Rome's Queen of Highways south of the city, has been turned into a ten-mile-long archaeological park best reconnoitered by bicycle. The roadside views have hardly changed since antiquity, with farmland still filled with sheep as well as the mausoleums of Roman nobles, which once bore epitaphs such as "I advise you to enjoy life more than I did" and "Beware of doctors: they were the ones who killed me."

Back in the city's historical center, the Colosseum—still the marquee symbol of the Imperial Age—has had part of its surviving outer wall cleaned, and a number of subterranean passages used by gladiators and wild beasts have been revealed to the public. (For ancient tourists as well, a visit here was de rigueur, to see criminals being torn to pieces or crucified in the morning, then, after a break for lunch, men butchering one another in the afternoon; chariot races in the Circus Maximus rounded out the entertainments.) The vast cupola of the Pantheon, at 142 feet once the largest in Western Europe, is undergoing restoration. And the Domus Aurea, Emperor Nero's Golden House, was reopened with great fanfare in 1999 after a ten-year renovation. Visitors can now rent "video-guides"—palm pilots that show close-ups of the ceiling frescoes and computer re-creations of several rooms. Thanks to these, standing inside the dark interior of the palace, which was buried in the first century A.D., one can envision the walls as Nero saw them, encrusted with jewels and mother-of-pearl, surrounded by fountains and with tame wild animals prowling the gardens.

In antiquity, Rome's most opulent monuments were part of the urban fabric, with residences squeezed onto the flanks of even the sacred Campidoglio; it was Mussolini who isolated the ancient ruins from the neighborhoods around them. Today, urban planners want to restore the crush. "Rome is not a museum," declares archaeologist Nicola Laneri. "Florence is more like that. It's the people that make Rome. It's the depth of history within individual lives."

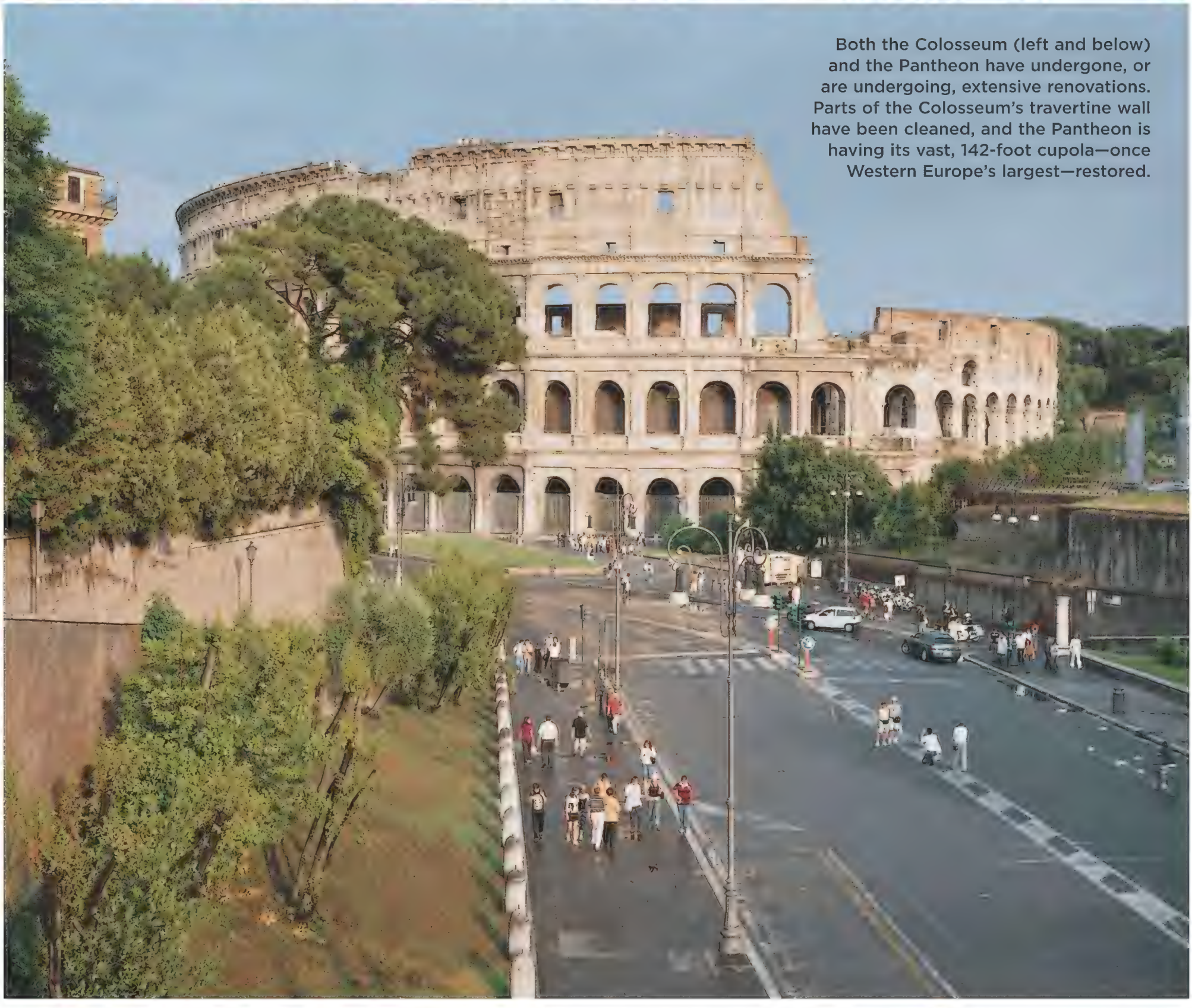
The Roman Forum has been opened to the public free of charge, returning to its ancient role as the city's original piazza: today, Romans and tourists alike stroll through its venerable stones again, picnicking on mozzarella panini near the ruins of the Senate House or daydreaming by a shrine once tended by Vestal Virgins. A few blocks away, the Markets of Trajan, created in the second century A.D. as a multistory shopping mall, now doubles as a gallery space for contemporary art. In a maze of vaulted arcades, where vendors once hawked Arabian spices and pearls from the Red Sea, and where fish were kept fresh swimming in salt water pumped from the coast ten miles away, the shops are filled with metal sculptures, video installations and mannequins flaunting the latest designer fashions.

Every Sunday, the strategic Via dei Fori Imperiali, which runs alongside the Imperial Forums toward the Colosseum, is blocked to motor vehicles—so pedestrians no longer have to dodge buses and dueling Vespas. The modern thoroughfare has been problematic ever since it was blasted through the heart of Rome by the Fascist government in the 1930s, leveling a hill and wiping out an entire Renaissance neighborhood. Mussolini saw himself as a "New Augustus" reviving the glories of the ancient empire, and he wanted direct sightlines from the Piazza Venezia, where he gave his speeches, to the great Imperial icons. In July 2004, the Archaeology Superintendency released a proposal to build walkways over the Imperial Forums, allowing Romans to reclaim the area. While the vaguely sci-fi design has its critics—and the project has gone no further than the drawing board—many city citizens feel that something must be done to repair Mussolini's misanthropy.

"It's really Rome's age-old challenge: How do you balance the needs of the modern city with its historical identity?" says Paolo Liverani, curator of antiquities at the Vatican Museum. "We cannot destroy the relics of ancient Rome, but we cannot mummify the modern city, either. The balancing act may be impossible, but we must try! We have no choice."

One effective bit of balancing took place at the Montemartini Museum, where sensuous marble figures are juxtaposed with soaring metal turbines in an abandoned 19th-century electrical plant. Opened in 1997, the exhibition was originally meant to be temporary, but it proved so popular that it was made permanent. Other attempts to mix modern and classical have been less universally admired.

When it comes to museums, Romans are spoiled for choice. One of the more unusual is the Crypta Balbi (terra cotta amphorae found at the site), which traces two millennia of Roman life by revealing the layers of history beneath a single city block.



Both the Colosseum (left and below) and the Pantheon have undergone, or are undergoing, extensive renovations. Parts of the Colosseum's travertine wall have been cleaned, and the Pantheon is having its vast, 142-foot cupola—once Western Europe's largest—restored.

Today Romans are as likely to visit the city's classical venues as foreign tourists (clockwise from top left: the ruins of Emperor Nero's Golden House; the Montemartini Museum; and the Via Sacra, or Sacred Way, an ancient road that runs through the city to the Forum).

Richard Meier's museum to house the Ara Pacis is the most controversial. The first new edifice in Rome's historical center since the days of Mussolini, it has been roundly criticized for its starkly angular travertine-and-glass design, which many Romans feel violates the ambiance of the old city. In one notorious attack, Vittorio Sgarbi, undersecretary to the Ministry of Culture, compared the museum's boxlike form to a "gas station in Dallas" and set the building afire in effigy; other Meier critics have lamented the "Los Angelization of Rome."

Of course, it's not just architects who are mixing past and present. As one example, the Gruppo Storico Romano, or Roman Historical Group, lures everyone from bank clerks to truck drivers to its school for gladiators on the Appian Way. Even visiting the school's headquarters tests one's nerves. Behind a corrugated iron fence in a dimly lit courtyard, half-a-dozen students don tunics and helmets and grab sinister-looking props such as tridents and daggers. The teacher, Carmelo Canzaro, 36, runs a clothing store by day, but becomes Spiculus when the sun sets. "There's nothing in the ancient texts that describe gladiators' training techniques," he admits, "so we have to improvise." As the students—all male—begin to swing and parry with wooden swords, "Spiculus" adds: "You have to pay complete attention. One lapse and you can be caught off balance." (He himself was sitting the evening out, recovering from a broken ankle incurred at a recent demonstration bout.)

HBO's new series "Rome" (filming at the sprawling Cinecittà studios) attempts to demythologize antiquity.

During a rest period, a young computer programmer, Massimo Carnevali, 26, a.k.a. Kyros, explains the school's appeal. "It combines history with physical exercise," he says. "I love the discipline." Another student, Ryan Andes, 26, an opera singer from Philadelphia, says, "To come here and chop at people with swords was a dream come true."

Edward Gibbon understood that appeal. Although he was no fan of gladiatorial combat—he found the practice "inhumane" and "horrid"—he would always remember the impression his first visit to Rome made on his youthful imagination. As he wrote in his autobiography: "At the distance of twenty-five years, I can neither forget nor express the strong emotions which agitated my mind as I first approached and entered the eternal city. After a sleepless night, I trod, with a lofty step, the ruins of the Forum; each memorable spot where Romulus stood, or Tully spoke, or Caesar fell, was at once present to my eye, and several days of intoxication were lost or enjoyed before I could descend to a cool and minute investigation."

HBO'S ROME

Despite its grandiose monuments, most of Imperial Rome was a squalid maze jammed with crumbling tenement houses lining ten-foot alleys filled with tradesmen, vendors and pedestrians as well as the occasional falling brick or the contents of a chamber pot. Jugs of wine hung from tavern doors. The street noise was deafening. ("Show me the room that lets you sleep!" observed the satirist Juvenal. "Insomnia causes most deaths here.") Rich and poor were squeezed together, along with immigrants from every corner of the empire—professors from Greece, courtesans from Parthia (modern Iraq), slaves from Dacia (Romania) and boxers from Aethiopia. Animal trainers, acrobats, fire-eaters, actors and storytellers filled the forums. ("Give me a copper," went a refrain, "and I'll tell you a golden story.")

On my last day in Rome, I explored the urban depths: I lurched through the dismal Subura, a slum neighborhood where Romans lived in cramped, windowless rooms with no running water, and I peered into one of their unisex latrines, where they wiped themselves with a communal sponge. Around one corner, I stumbled onto a makeshift arena, where a fight was in progress: 400 Romans in tattered, grimy tunics howled with laughter as mangled corpses were dumped on carts and limbs lay about in pools of blood. A dog dashed in to grab a severed hand.

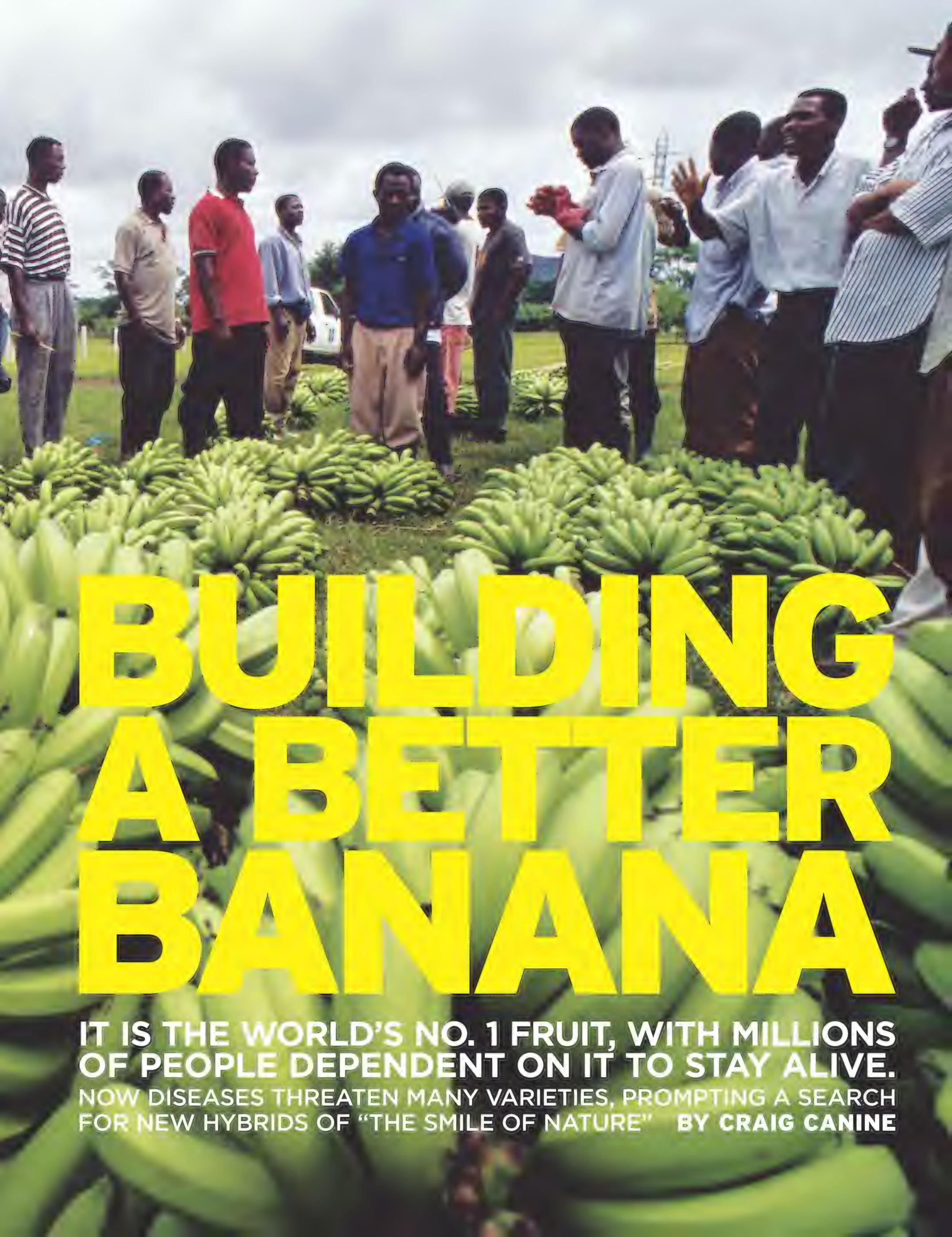
Soon, during a lull in the mayhem, a svelte, Gucci-clad Italian woman tottered across the bloody sand in stilettos, to touch up the makeup of one of the extras. This was Cinecittà, the sprawling film studio on the outskirts of Rome that some call the world's greatest factory for images of ancient life. Such classics as *Quo Vadis*, *Ben-Hur* and *Cleopatra* were all shot here, as well as Fellini's *Satyricon*.

HBO is filming its $100 million series "Rome" (which began airing August 28) on a five-acre set that re-creates the city in the last days of the Republic. Bruno Heller, the show's co-creator, hopes that the series will do for antiquity what HBO's 2004 "Deadwood" did for the Old West: demythologize it.

"It's sometimes hard for us to believe that the ancient Romans really existed in the quotidian sense," Heller said, as we strolled back lots filled with period uniforms and props. "But they were real, visceral, passionate people." The series attempts to show the Romans without judging them by modern, Christian morality. "Certain things are repressed in our own culture, like the open enjoyment of others' pain, the desire to make people submit to your will, the guilt-free use of slaves," Heller added. "This was all quite normal to the Romans." —T.P.

MARIANNA BERTAGNOLLI / AP / WIDE WORLD PHOTOS

Overplanting of blight-prone varieties, including the cloned Cavendish banana Americans eat almost exclusively, worries experts. In Africa (a market in Cameroon), "the banana is not about dessert or a snack," says researcher Kodjo Tomekpé. "It is about survival."



BUILDING A BETTER BANANA

IT IS THE WORLD'S NO. 1 FRUIT, WITH MILLIONS OF PEOPLE DEPENDENT ON IT TO STAY ALIVE.

NOW DISEASES THREATEN MANY VARIETIES, PROMPTING A SEARCH FOR NEW HYBRIDS OF "THE SMILE OF NATURE" **BY CRAIG CANINE**

SLEET SLICES THROUGH THE SKY nearly sideways, propelled by Arctic blasts from the North Sea. I am in northern Belgium, wandering the grounds of a Baroque castle at the Catholic University of Leuven, about 15 miles northeast of Brussels. I am on a pilgrimage of sorts, seeking enlightenment about *Musa sapientum*, better known as the common supermarket banana. Building 13, a plain two-story brick structure within the castle walls, houses the world's largest collection of banana varieties.

BELGIUM

VIETNAM

Researchers are racing to develop hardy new breeds (left, plant samples at the Catholic University of Leuven). First cultivated in Southeast Asia 10,000 years ago (a plantation in the Mekong Delta), bananas were carried to Africa and then to the Americas.

The basement room is the size of a semitrailer. It is cool and humid, with a slight musty odor. Two rows of metal shelving hold hundreds of wire racks filled with yellow-capped test tubes. Each tube contains a small, rooted plantlet about the size of your little finger. All told, the room contains nearly 1,200 varieties of bananas. They look like overgrown bean sprouts. "After you've worked with tissue cultures for a while, you begin to recognize different types," says Ines Van den Houwe, the Belgian agricultural engineer in charge of the collection. She points out specimens. "This one is probably a type of dessert banana. Here's a hybrid plantain. And this looks like a balbisiana cooking banana," she says, referring to its wild forebear, *Musa balbisiana*. "Roughly 900 of these are traditional cultivated varieties. Another 100 are improved varieties or hybrids from various breeding programs. And about 180 are wild relatives. We have material from 44 countries, from the plantations of Central America to the deepest rain forests in Malaysia."

And why are they all here, in deepest Belgium?

She flashes a smile. "Belgium doesn't grow bananas, so we don't have banana pests and diseases. It's easy to quarantine the plants—there's no risk of introducing dangerous diseases to a native population of bananas, because there isn't any."

This living library of Musa diversity stands in contrast to my neighborhood grocery store back in the United States. On a recent visit to the produce section, I counted 11 varieties of apple, four kinds of pear, six different potatoes, nine types of onion and seven kinds of lettuce. Then I came to the banana bin. To paraphrase Henry Ford's comment about Model Ts, I could have any kind of banana I wanted, as long as it was a yellow Cavendish.

The $4 billion-a-year worldwide banana export trade is almost entirely based on vast plantations filled with genetically identical Cavendish clones. It is the supermarket banana's lack of genetic diversity that has put it at risk, perhaps even (as some scientists say) at risk of extinction. A similar situation with another crop, the potato, set the stage for the great Irish famine of the 1840s, after the high-yielding potato varieties favored by Irish farmers fell prey to an airborne fungus that turned whole fields of tubers black and rotten overnight. Today, similar pests are stalking the banana. Topping the list is a fungal disease called black sigatoka. Originally found in Indonesia's Sigatoka Valley, it attacks the

CRAIG CANINE is the author of Dream Reaper, *a book about the role of old-fashioned invention in modern American agribusiness.*

MICHEL DE GROOT / WORLD PICTURE NEWS; SUE FORD / SCIENCE PHOTO LIBRARY / PHOTO RESEARCHERS; PP. 96, 97 ANTOINE DEVOUARD / REA / REDUX

leaves of banana plants, shutting down the plants' ability to photosynthesize. The wind-borne fungus has spread throughout Asia, Africa and Latin America. Many kinds of bananas are susceptible to black sigatoka, but none more so than the Cavendish. Large-scale growers can keep it from devastating their harvests only by spraying fungicides from airplanes. This escalating chemical warfare is economically unsustainable, to say nothing of its toll on the natural environment or the health of field workers. "Is sigatoka the end of the banana as we know it? No. Rumors of its demise are exaggerated," says Dave McGlaughlin, an environmental director with Chiquita Brands International. "But it's a serious issue. Sigatoka control is 20 percent of our costs, and it's not getting better." Banana growers in some tropical countries face threats even worse than sigatoka, such as bunchy-top virus, fusarium wilt and cigar-end rot. As a result, efforts to develop new, disease-resistant types, including alternatives to king Cavendish, are growing increasingly urgent.

More is at stake than a healthy snack. While the banana is America's No. 1 fruit (on average, each person in the United States gobbles more than 26 pounds of them a year, compared with 16 pounds of apples), bananas play a small role in the American diet. But for hundreds of millions of people in developing countries, bananas are a dietary staple—the least expensive source of nutritious calories. The banana ranks fourth after rice, wheat and corn among the world's most economically important food crops. Of the nearly 80 million tons of bananas produced annually around the globe, less than 15 percent are exported to the United States, Europe and Japan. The rest are consumed locally. India and Brazil, the top two banana-producing countries, export almost none. Yet sub-Saharan Africa leaves both countries far behind in per capita consumption. A typical person in Uganda, Rwanda or Burundi consumes more than 550 pounds of bananas a year. They eat (and drink in beer and juice) a type known as east African highland bananas. In Uganda, the word for this banana is *matooké*. It is cooked and mashed in a traditional dish that is also called matooké. In its broadest definition, matooké means "food." If you held a feast in Uganda and did not serve bananas, the guests would say you had served no food.

But in the past 30 years, banana yields in east and west-central Africa have declined by half. Black sigatoka and other diseases weaken the growing plants, which become more susceptible to attack by weevils and worms. Infested plots that supported a continuous crop for 50 years must be abandoned, and the specter of hunger looms ever larger. "Only five scientists in the world are currently leading programs to breed improved bananas," says Emile Frison, director general of the International Plant Genetic Resources Institute, a Rome-based organization that promotes genetic diversity of food crops. "Such a meager research effort is out of proportion to the scale and importance of the problem. This must be reversed if the world's most popular fruit is not to decline further."

Plantation workers go to great lengths not to mar the delicate Cavendish banana's thin skin (left, foam pads protect a bunch). The highest banana consumption occurs in Uganda (right, in Masaka) and Rwanda, with some 550 pounds per person annually.

DAVID ALAN HARVEY / MAGNUM PHOTOS; J. HOLMES / EXILE IMAGES

ONE OF THOSE FIVE scientists is Kodjo Tomekpé. "Here in Africa, the banana is not about dessert or a snack," Tomekpé says. "It is about survival. Our challenge is to multiply and distribute improved varieties for people who rely on them as a central part of their daily diet."

Tomekpé and I are sitting in a screened-in dining hall near the town of Njombé in Cameroon's Southwest Province, about 120 miles west of the capital city of Yaoundé. We have just finished a dinner of chicken and fried plantains, the

BANANA GROWERS IN SOME TROPICAL COUNTRIES FACE THREATS EVEN WORSE THAN SIGATOKA FUNGUS, SUCH AS BUNCHY-TOP VIRUS.

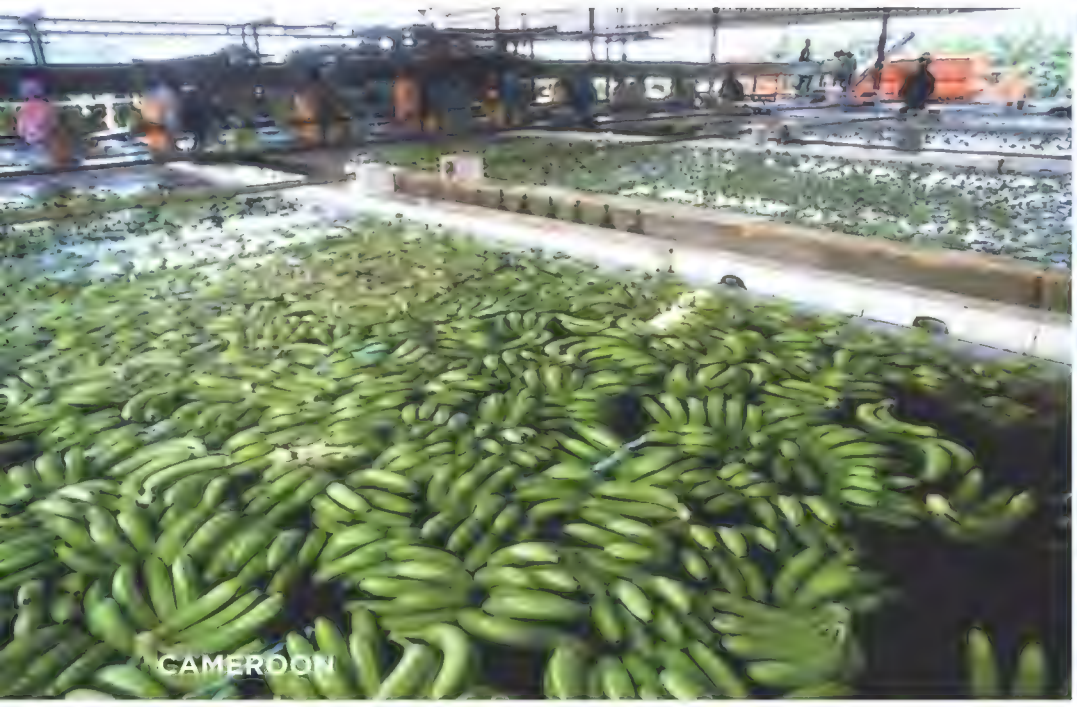
starchy type of banana favored in west Africa and elsewhere. For dessert, we have ordered a few Cavendish bananas, which our waiter has brought on a plate. They are perfectly uniform in size, shape and shade of yellow. Tomekpé, a compact, slender man in his early 50s, picks one up. "The Cavendish banana is too beautiful to be true," he says. He peels it and takes a bite. "It is beautiful, but to me this is an uninteresting banana. It has one, bland taste: sweet." He takes another bite, then wrinkles his nose and puts the banana down. "There are such diverse qualities to be found in bananas—small, medium, large, yellow, red, creamy, tart, sweet, balanced. This is the first Cavendish I've had in three years. Because I have such diversity to choose from, why would I want this one?"

Director of the African Research Center on Bananas and Plantains (CARBAP), Tomekpé oversees one of the world's largest field collections of bananas. Unlike the germ plasm preserved in test tubes in Belgium, the plants in CARBAP's collection are tree-size specimens. On six acres at the edge of Njombé, more than 400 varieties of bananas grow in beautifully regimented rows separated by wide strips of green turf. Black metal signs identify each variety by name: Tomola, Pelipita, Poupoulou, Red Yadé, Mbouroukou. Some fruit is long and skinny, like a witch's fingers. Others are short and squat, and grow like clusters of green peppers. One type has dark green skin with white stripes. It's known as the tiger plantain.

We stroll along the beds. "Here is a wild example of *Musa acuminata*," Tomekpé says. It stands little more than head high and looks comparatively spindly. "This is one of the two wild ancestors that edible bananas are descended from. It originally grew, many thousands of years ago, in and around Malaysia." He produces a pocketknife and cuts off a single green fruit. It is the size of an okra pod or a sweet pickle. Slicing it in half, lengthwise, he probes the immature, milky flesh with his knife and pries out several hard seeds that resemble peppercorns.

Over time, random mutations produced acuminata plants with seedless fruits. They were more edible than seed-filled fruits, so people tended to cultivate the female-sterile mutants, giving rise to domesticated subspecies. Pollen from these cultivated plants sometimes reached the flowers of their wild acuminata cousins. Matings produced hybrids that possessed all the fertility of mules.

Walking 30 feet to an adjacent bed, Tomekpé points to a very different-looking plant. Everything about it, including its fruit, is three or four times bigger than the wild *M. acuminata*. "This is a wild *Musa balbisiana*," he says. "It is the other original parent species. As you can see, balbisiana is far more robust, and has many more seeds." He cuts open a fruit, which nearly bursts with round, black buttons. "A single bunch of these can contain 20,000 seeds." Beneath balbisiana's towering canopy of leaves, the ground is covered with them, like pea-gravel. "Balbisiana originated in India. That is where, many thousands of years ago, acuminata crossed with balbisiana to create natural hybrids. And that is how we got the plantain. Nearly everything you see around you is a variety of plantain."



As a dietary staple, the banana (left, fruit is washed in water tanks to minimize blemishing) is surpassed only by rice, wheat and corn. Most bananas and byproducts sold in the U.S. come from South and Central America (workers peel "fingers" for puréeing).

BANANAS DO NOT GROW ON TREES. The plants that produce them are enormous herbs with non-woody "trunks" called pseudostems, which consist of the compacted bases of the plant's long, torpedo-shaped leaves. The banana plant is a photosynthetic fountain that spouts leaf whorls out of its top. After the whorls emerge, they unfurl, and the leaves droop downward like palm fronds. The last leaf uncurls to reveal the banana's true stem—a green, fibrous extrusion with a softball-size magenta bud at the end. As the stem lengthens, the bud weighs it down. Petal-like bracts surrounding the pendulous bud gradually drop away to reveal

ANTOINE DEVOUARD / REA / REDUX; PETER ESSICK / AURORA

clusters of blossoms. Oblong fruits develop at the base of each blossom. The flower-bearing tips of the fruits curve toward the sun as they mature, producing the crescent shape that Germans sometimes call "the smile of nature."

Each layer of fruits in the ascending spiral is called a hand. Individual bananas are called fingers. A full stem, or bunch, of bananas can have as many as 20 hands and hundreds of fingers (a bunch of Cavendish bananas typically produces six or seven hands and 150 to 200 fingers). A banana's growing cycle, from baby plant to harvest-ready fruit, is between 9 and 18 months. After bearing a single bunch of bananas, the mother stalk dies or is cut down, soon to be replaced by one or more "daughters," which sprout as suckers from the same underground rhizome that produced the mother. The suckers, or sprouting corms, are genetic clones of the parent plant.

GUATEMALA

VIETNAM

The bulk of the $4 billion worldwide banana trade involves the Cavendish (loading a cargo ship in Puerto Santo). The United States and Europe are the leading importers, followed by Japan, heavily supplied by plantations in Vietnam (a Hanoi market).

RUSSELL GORDON / AURORA; KHAM / REUTERS

The banana may be the world's oldest cultivated crop. Human beings in Southeast Asia began to select and cultivate wild Musa varieties as many as 10,000 years ago. It may have taken a few thousand years for those early agriculturists, acting in tandem with nature's genetic dice, to produce sterile hybrids like the Cavendish and other sweet varieties still cultivated today. Incapable of reproducing sexually, these seedless wonders propagate vegetatively, by suckering. During the first or second millennium B.C., Arab traders carried banana suckers with them from Southeast Asia to the east coast of Africa, and Tomekpé says, "Swahili people exchanged planting material with Bantu people, who took the plantains into the central forest and westward across the continent."

Spanish explorers carried bananas from Africa's west coast to Latin America. A 16th-century Spanish historian, Gonzalo Fernandez de Oviedo y Valdes, documented the plant's arrival in the New World. "This special kind [of fruit]," Oviedo wrote, . . . "was brought from the Island of Gran Canaria in the year 1516 by the Reverend Father Friar Tomas de Berlanga . . . to this city of Santo Domingo, whence they spread to the other settlements of this island [of Hispaniola]. . . . And they have even been carried to the mainland, and in every part they have flourished."

Bananas flourished in Africa for so long after they arrived from Southeast Asia that some parts of the African continent—the eastern region around what is now Uganda, and the western region bounded by the Congo basin—became secondary centers of genetic diversity. "Farmers in various parts of Cameroon have been cultivating plantains for a very long time," says Ofundem Tataw, an ethnobotanist from Cameroon's University of Buea. "They possess a great deal of traditional knowledge of working with the diversity here." Tataw is squeezed with three other people in the back seat of a four-wheel-drive pickup truck. We lurch slowly along a road strewn with boulders of black volcanic basalt expelled from Mount Cameroon, at 13,435 feet the tallest in West Africa.

Tataw is studying the link between plantain varieties and local culinary practices. "Traditionally, each local variety is used in a very particular way," she says while we're stopped at a small farm. "For example, these bigger plantains, known as horn type, are used for roasting when picked at a certain stage of ripeness. When picked at a slightly different stage, they are dried, crushed into a paste and served with dried fish."

One CARBAP mission is to introduce disease-resistant varieties that farmers can test in their own fields, side by side with the local plantains they are accustomed to growing. We stop beside a remote country road on Mount Cameroon's east slope. Tataw, Tomekpé, two local farmers (both women), a government agriculture official and I

HUMAN BEINGS IN SOUTHEAST ASIA BEGAN TO SELECT AND CULTIVATE WILD MUSA VARIETIES AS MANY AS 10,000 YEARS AGO.

walk single file along a narrow, pumice-covered path. To me—a Midwestern American reared on the sight of neat corn and soybean rows stretching to the horizon—we appear to be bushwhacking through a patch of wild jungle upon which Mount Cameroon regularly rains down boulders the size of *Sputnik*. It is not jungle, however, but laboriously cultivated farmland, carefully tended plots of mixed cocoa trees, oil palms, plantains, corn and papaya, with occasional patches of ground-hugging cocoyams or spindly cassava shrubs.

We step across an invisible boundary where those crops give way to bananas. A small farmers' cooperative has planted 25 different varieties using pest-free suckers provided by CARBAP. A few are disease-resistant hybrids developed at the Honduran Foundation for Agricultural Research (FHIA), the most prolific of the world's half-dozen banana-breeding programs. FHIA hybrids, touted in the international press as potential saviors, shrug off the effects of black sigatoka and other serious Musa scourges. In this field, farmers are experimenting with two of the hybrids, FHIA-02 and FHIA-25. Both can be cooked when green and, unlike plantains, which remain starchy when ripe, can also be eaten out-of-hand as dessert bananas.

"Only five scientists in the world are currently leading programs to breed improved bananas," says Rome-based plant researcher Emile Frison. "This must be reversed if the world's most popular fruit is not to decline further" (an Arlington, Virginia, store).

Someone offers me a bright yellow FHIA-02 banana. It's medium-sized, firm and buttery in the mouth and moderately sweet with a slightly acidic, tangy edge. It seems like a fine banana to me, but it is not getting rave reviews from the farmers here. They prefer larger, starchier, more typical plantain types. Of the 25 CARBAP introductions, the favorite is a dry-textured, orange plantain from Papua New Guinea called Maritu, which commands a premium at local markets. FHIA-02 often winds up as animal feed despite its disease-resistance.

Breeding an überbanana that fends off lethal diseases while also meeting the exacting requirements of growers and consumers isn't rocket science. It's harder than that. How do you arrange matings between plants that, for the most part, can't mate? The trick is to make ingenious use of whatever traces of fertility—pollen-bearing male flower parts and seed-bearing fruits—you can find among varieties, wild or cultivated, that have the traits you are looking for. To improve your chances of success, you need access to the largest possible pool of genetic diversity, such as the germ plasm preserved in Belgium and in CARBAP's extensive field collection. Tomekpé and his associates found a promising pollinator in a wild banana from India called Calcutta 4. "It makes a good male parent," Tomekpé explains, "because it is highly resistant to black sigatoka and nematodes, it's highly male-fertile, and it's a dwarf." Dwarfism is a useful trait for CARBAP's geneticists, because their main goal for years has been to develop disease-resistant plantain hybrids that have large bunches but short stature. Reduced height not only makes the plants easier for farmers to work with but also less prone to toppling by wind, a major cause of banana crop loss everywhere.

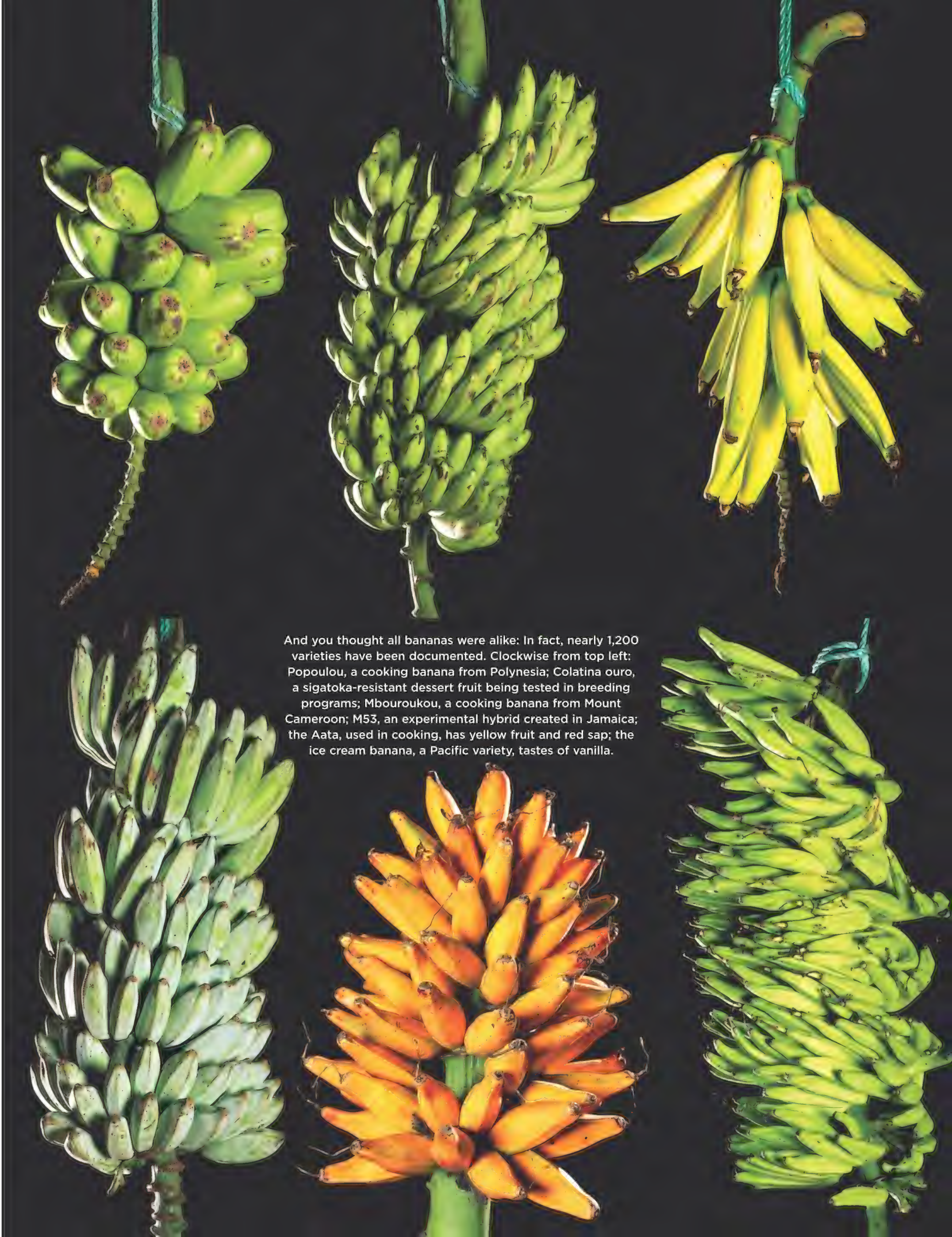
Phil Rowe, who led the FHIA breeding program for many years before his death in 2003, invented the now-standard procedure for creating banana hybrids. The first step is to gather as much pollen as possible from the chosen male parent and use it to fertilize potential female parents at the flowering stage. Next comes a four- or five-month wait for the plants to produce fruit. Then the bananas are harvested, peeled by hand and pressed through a sieve. A ton of fruit might yield a handful of seeds, less than half of which will germinate naturally. After the precious few seedlings are planted comes another 9- to 18-month wait. Finally, up to two years after the initial mating, disease resistance and other characteristics can be evaluated.

Rowe and his colleagues repeated this painstaking procedure for tens of thousands of different parental crosses. The vast majority yielded offspring that didn't pass muster. Only after decades of this work did Rowe's lab release its first potentially commercial hybrid, FHIA-01, a.k.a. Goldfinger. It is the world's first disease-resistant sweet banana with the potential to take on the almighty Cavendish.

The process is not quite as slow today, thanks to molecular genetics techniques. "We can also use molecular techniques to perform rapid screening of hybrids for susceptibility to diseases, as well as for nutritional and other characteristics, such as fruit texture and taste," says Pascal Noupadja, the leader of CARBAP's breeding lab. "We use molecular techniques for screening and propagation. But we are working only with conventional breeding here, with pollen

MEDIUM-SIZED, FIRM AND BUTTERY, IT SEEMS LIKE A FINE BANANA TO ME, BUT IT IS NOT GETTING RAVE REVIEWS FROM THE FARMERS HERE.

JAY L. CLENDENIN; P. 103 ANTOINE DEVOUARD / REA / REDUX (6)



And you thought all bananas were alike: In fact, nearly 1,200 varieties have been documented. Clockwise from top left: Popoulou, a cooking banana from Polynesia; Colatina ouro, a sigatoka-resistant dessert fruit being tested in breeding programs; Mbouroukou, a cooking banana from Mount Cameroon; M53, an experimental hybrid created in Jamaica; the Aata, used in cooking, has yellow fruit and red sap; the ice cream banana, a Pacific variety, tastes of vanilla.

and flowers—no gene splicing. We leave genetic modification of bananas up to other labs."

"Our program is only ten years old," Tomekpé chimes in. "But we have created several hundred plantains of a new type—dwarf-size plants with high resistance to disease and pests, plus good productivity and fruit character." At the request of the European Union (EU), which provides most of CARBAP's funding, Tomekpé recently broadened his breeding program to include dessert bananas. "The EU said they'd continue to support us but asked that we work on preserving the dessert banana too. That's what Europeans know and see. They don't want to see their bananas disappear."

Dessert bananas, which are less genetically diverse and even less fertile than plantains, are harder to breed. The Cavendish is not a candidate for conventional breeding at all, as it produces absolutely no pollen or seeds. It's an evolutionary dead end. Because of its high susceptibility to many diseases and its inability to acquire resistance through breeding (although some scientists think gene splicing could change that, someday), scientists worry that a particularly nasty pest that spread widely could wipe it out.

Might Americans someday slice a version of this African variety (a bunch of Yangambi Km5) onto their cereal?

The banana industry has experienced just such a doomsday scenario once before. International trade in the fruit began in the early 1870s, when Lorenzo Dow Baker, a Cape Cod fishing captain, brought the first large banana shipments to the United States. The variety that Baker carried from Jamaica to New England on his schooner was called Gros Michel. "Big Mike" reigned as the No. 1 export banana until the 1940s and '50s, when a fierce soil pathogen known as Panama disease devastated it. Yet Panama disease left Cavendish-type bananas unscathed. The Cavendish didn't taste as good as the Gros Michel, and its thinner skin made the fingers more difficult to handle and ship without bruising. But the major banana export concerns, led by the huge United Fruit Company (which Baker co-founded as the Boston Fruit Company in 1884), had no choice but to replant their vast plantations with Cavendish and to overhaul the system of banana mass production that United Fruit (now Chiquita Brands International) had invented around the turn of the 20th century. In the original system, Gros Michels remained intact in enormous bunches from the farm to the grocery store. But with the fragile Cavendish, plantation owners had to build packing houses on each farm, so the big bunches could be cut down to small clusters, washed, and gently laid into protective boxes before shipping. The costly transition to a new banana took more than a decade.

A replay of that upheaval may be on the horizon. A new, more virulent strain of Panama disease has started to spread. The new strain, known as Tropical Race 4, has proved lethal to a broader range of banana hosts than earlier mutations of the fusarium bacteria that causes Panama disease. Race 4 is as deadly to Cavendish as the earlier strain was to Gros Michel. It first appeared in Malaysia and Indonesia, and has spread to northern Australia and South Africa—though not, so far, to central Africa or Latin America. No known pesticide is effective against it for long. Banana exporters fear that someone may accidentally or maliciously carry infested soil or plants from the current hot zone of containment to other commercial banana-growing regions, causing devastation. "People say this Race 4 could be the end of the banana," Tomekpé told me one evening. "That is an exaggeration. It could be the end of Cavendish and other sterile dessert bananas, but for many other types, there is hope."

One source of hope could be Yangambi Km5, a variety I saw during my travels with Tomekpé. It was named for the spot, three miles from the Yangambi nature preserve, in the Democratic Republic of Congo where it was found and documented. "Its name in Swahili is Ibota, which means abundance," Tomekpé said. "It yields abundantly, with big bunches and many fingers. It's highly tolerant to many pests, and very male and female fertile, so it's easy to cross with other varieties. But the peel is quite thin, so it's not ideal for handling and shipping. We are working with it, developing crosses for a thicker skin and good fruit size. It's a very promising candidate for improvement. I think there will be a market for it someday."

Ambling through several acres of bananas at a CARBAP testing station, Tomekpé found some ripe fingers of Yangambi Km5. He gave me one and urged me to try it. Its thin peel came off easily. The fruit was slightly shorter and stubbier than your average Cavendish. I took a bite. The flesh was creamy and sweet, though far from cloying. I detected hints of strawberry, vanilla and apple—perhaps even a dash of cinnamon. I like a good Cavendish as much as anyone, but this banana was in a different league. Yangambi Km5 has survived for centuries thanks to the care of subsistence farmers in the heart of Africa, and yet when I bit into it I imagined I was tasting the future.

BANANA EXPORTERS FEAR THAT SOMEONE MAY CARRY INFESTED SOIL OR PLANTS FROM THE CURRENT HOT ZONE OF CONTAINMENT.

CRAIG CANINE

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PEOPLE'S CHOICE

ALMOST FROM BIRTH, ANDREW JACKSON WAS IN TRAINING TO BECOME DEMOCRACY'S CHAMPION **BY H. W. BRANDS**

In the biggest political struggle of their era, Jackson (right) took on John Quincy Adams.

JOHN QUINCY ADAMS had seen this day coming for years. His only consolation was that he had helped postpone it till now. The son of the man he considered most responsible for American independence, Adams felt a peculiar responsibility for the outcome of the republican experiment. And these last few years the experiment hadn't been turning out well at all.

His father, John Adams, and most of the other founders had feared that republicanism would degenerate into democracy: that government *of* the people would become government *by* the people. Nothing in history disposed them to look hopefully on such a development, for never in history had ordinary people run their own affairs without very quickly running them into the ground. The elder Adams linked arms after the Revolution with those who sought to curb the popular excesses of the revolutionary era; at Philadelphia in 1787 a convention of the skeptics wrote a constitution that took power from the states and conferred it on the central government, and in doing so diminished the influence of the people in politics generally. As vice president and then president, John Adams continued to work to keep power out of the hands of the unlettered and incompetent, and in the hands of those best suited by education and experience to exercise it responsibly.

But it was a losing cause. A first setback occurred when Thomas Jefferson defeated John Adams for president. Jefferson was more the aristocrat than Adams, as anyone who compared Monticello, where Jefferson's slaves worked

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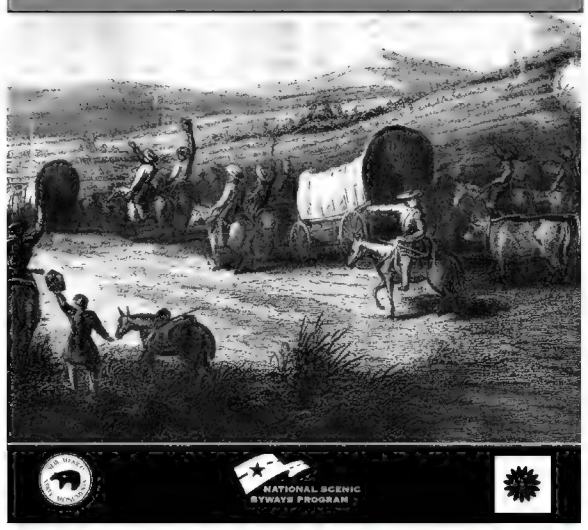

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their master's plantation, with the Adams home in Massachusetts, where Adams himself tilled his modest garden, could see at once. But Jefferson cast himself as the tribune of the people, and he carried the day. James Madison was hardly less elegant than Jefferson, but he, too, posed as the defender of the many against the few. By the end of Madison's presidency the formula had been perfected, and James Monroe, yet another Virginia planter, entered the Executive Mansion almost unopposed.

John Quincy Adams watched and learned. He noted, among other things, that being Secretary of State gave a man a large head start toward the presidency. Jefferson had been Secretary of State before becoming president; so also Madison and Monroe. So when Monroe offered to make Adams his Secretary of State, the offer included a presumption of the presidency thereafter, and Adams gladly accepted.

Yet even while he did his time as a diplomat, the political climate continued to shift. Like an autumn storm that rose in the west and gathered strength as it approached the Atlantic, the wind of democracy began to blow in the valleys of the Ohio and Mississippi and gained force on its way east. New states entered the Union with few restrictions on the vote, and their example caused the old states to change their own rules. Equally alarming to those—like Adams—who counted on the restraining effect of representation, the states began to allow voters, rather than the state legislatures, to choose presidential electors. Campaigns for president became popularity contests. The highest office in the land went to the favorite of the lower classes.

Adams escaped the early gusts, winning the presidency in 1824 by luck and political art. But during the next four years he often wished he hadn't won, so abusive was his treatment at the hands of those who claimed to speak for the people. And now—on the morning of March 4, 1829—he prepared to deliver the presidency to the man the people, in all their ignorant majesty, had chosen: Andrew Jackson.

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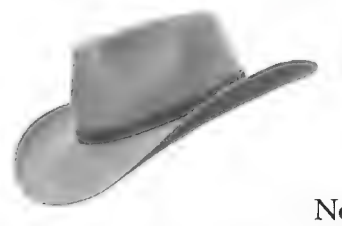

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THE MORNING of Adams' defeat should have been the morning of Jackson's greatest triumph. And in some ways it was. Everything Adams deplored about the direction of American politics, Jackson applauded. To Jackson, the current contest in America was simply the latest stage of the historic struggle against privilege that ran back to the Magna Carta and included the Protestant Reformation of the 16th century, the English Revolution of the 17th and the American Revolution of the 18th. At each stage the people seized more of what by right belonged to them, from those who intended that power remain the monopoly of the few. Finally, for the first time in American history, and for one of the very few times in human history, the people had chosen one of their own to govern them. And now they were to install him in the highest office in the land. A man would have been dead to noble emotion not to feel the power and meaning of the moment.

Jackson's life was a struggle: At 14, he took a gash to the head for refusing to wipe a British officer's boots.

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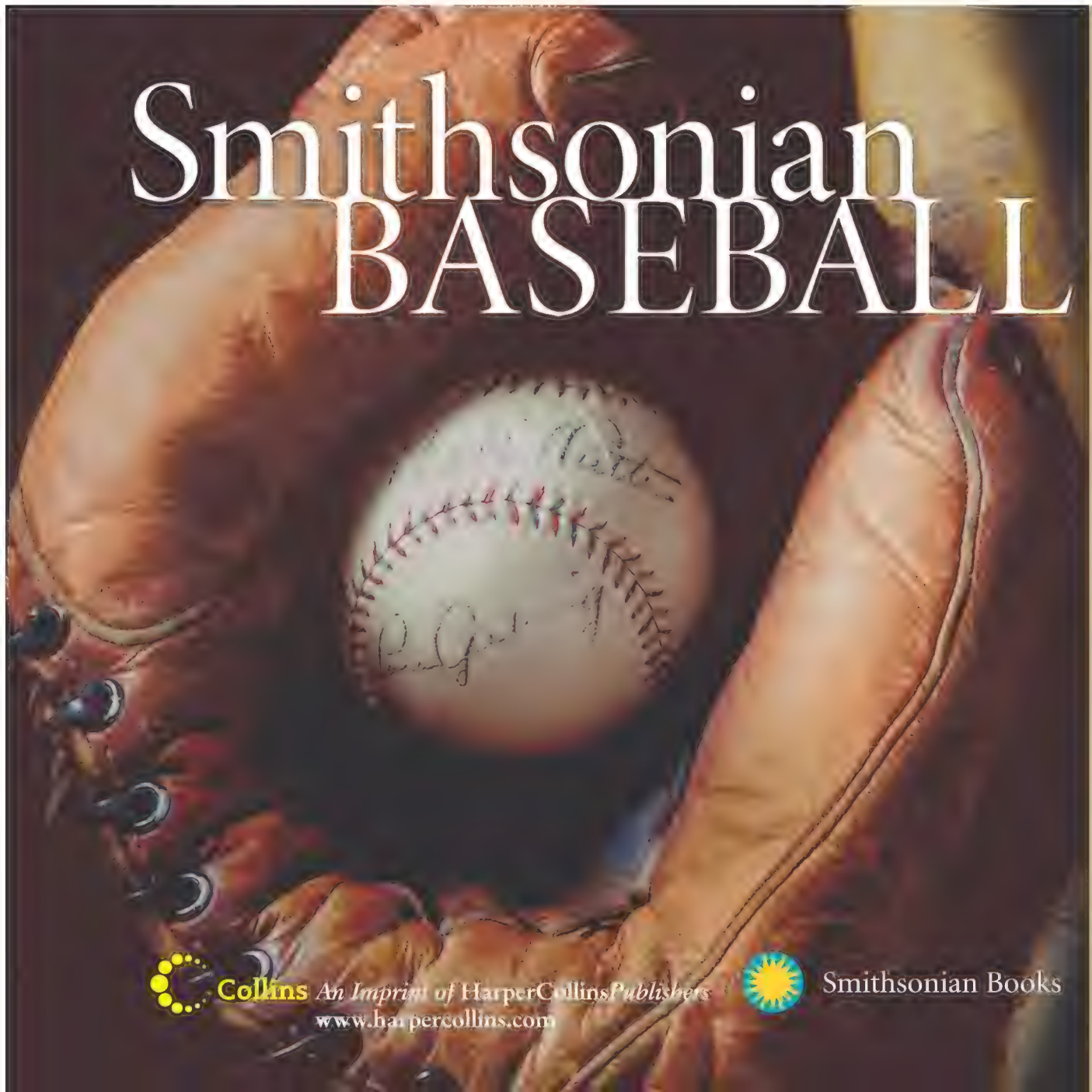
Jackson felt it all—and much besides. The thousands of farmers, mechanics and crossroads merchants who had come to Washington City to inaugurate him, and the hundreds of thousands of their brethren who had voted for him, could almost taste the fruits of their hero's triumph, but Jackson alone knew what the victory had cost him. He had been fighting for the people's right to direct their own affairs since the Revolutionary War, when, as a mere boy, he took up arms against Britain. A gash to the head from a British sword left him with a permanent crease in his skull and an abiding hostility to all things British; smallpox contracted in a British prison marked the beginning of a lifetime of compromised health. The war also cost him his mother and brothers (his father had died before his birth), throwing him orphaned upon a turbulent, threatening world.

As a young man he entered politics in Tennessee. He battled the antide-



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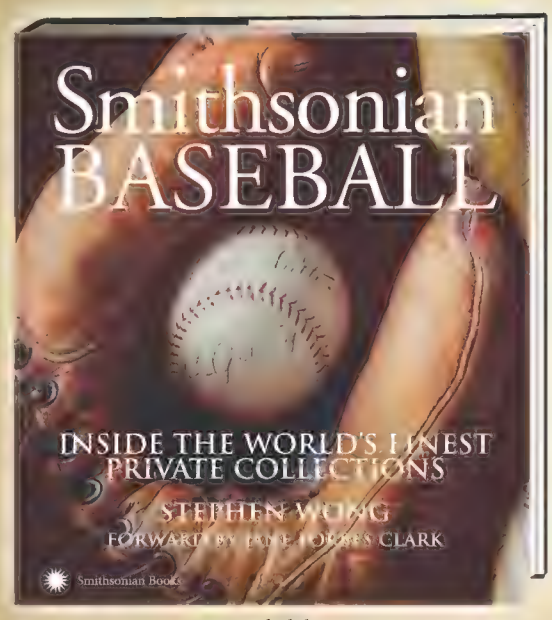

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mocratic forces in the state and the nation, going so far as to challenge George Washington when the father of his country adopted what Jackson took to be excessive airs. His audacity on behalf of the people earned him enemies who slandered him and defamed even his wife, Rachel. He dueled in her defense and his own, suffering grievous wounds that left him with bullet fragments lodged about his body.

When the British again threatened American autonomy, by provoking Indian attacks in the West and seizing ships and sailors on the Atlantic, Jackson joined his voice to those of others demanding war in defense of American security and rights. When the 1812 war came, he led an offensive against the Indians, and upon its success took charge of the defense of the Mississippi against Britain's attempt to sever the United States along the line of the great river. At New Orleans in 1815, he threw the redcoats back, to their astonishment and that of most of his compatriots. The victory won him the adulation of the American people, but the campaign added to the ranks of his political enemies, who carped at his boldness and his impatience with the forms of military command.

The second war against Britain made clear to many Americans something Jackson had sensed from the first: that the struggle for American popular rights was of a piece with the struggle for North America itself. The opponents of popular rights had filled the ranks of the Loyalists during the first war against Britain; the same opponents, or their heirs, had been conspicuously apathetic, in some cases seditious, during the second British war. Jackson's victory at New Orleans didn't end the British threat; the British still held Canada, and their ally Spain occupied Florida and Mexico. As long as these foes hovered about America's borders, the American experiment in self-government remained in peril. And while it did, Jackson couldn't rest.

Not that he would have rested anyway. His entire life, Jackson had known only struggle. He struggled against

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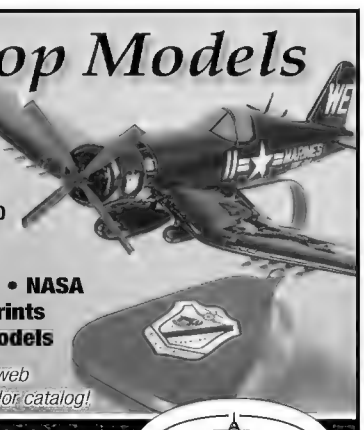

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poverty as a child, against authority as a youth, against the British and Spanish and Indians as a soldier, against the enemies of popular rule as an elected official. His struggles defined him.

They also defined his era in American history, which was how he came to symbolize it. Much later, after America became a world power, it could be difficult to remember a time when the success of the American experiment in self-government did not seem assured. But it never seemed assured to Jackson and most of his generation. He and they fought two wars against Britain, an undeclared naval war against France and countless battles against Indians. They struggled for independence, for security, for the land that provided the opportunity to pursue the happiness of which their Declaration of Independence spoke. They also fought among themselves: over the meaning of the American Revolution, over the Constitution, over republicanism and democracy, over slavery and expansion. Perhaps Jackson exaggerated the degree of danger his country and his conception of government faced. But if he did, he wasn't alone, and it was all those who shared his perception of the precariousness of their world who had made him their president.

And so he came to Washington. Yet even this greatest of his public triumphs was marred by the cruelest personal blow he had ever suffered. Just before he was to leave the Hermitage, his home near Nashville, for Washington, Rachel died. The proximate cause was physical, a failing heart. But the deeper cause was the strain his race for the presidency had placed on her mind and soul. In their desperation to cling to power, the partisans of John Quincy Adams had recirculated and embellished the earlier libels against Rachel's character. Jackson blamed the Adams men for her death, but he couldn't help asking himself whether he had been complicit. It was, after all, his ambition for the presidency that had provoked the latest attacks against her. If he had retired to the Hermitage, as she wished, rather than continue his strug-

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gle against the foes of popular rule, she would still be alive. The knowledge was the heaviest burden he had ever borne.

But as he rose from the ground beside her grave, the very weight of her death confirmed his resolve to carry the struggle forward. He couldn't bring her back, yet he could fight on, to ensure that those who killed her not benefit from their crime. Like most great warriors, Jackson had always conflated the personal with the public; his own enemies became the enemies of his cause. So they did now, more than ever.

And on the morning of March 4, 1829, with the memory of Rachel in his heart and the cause of the people in his mind, he set off from his hotel to the Capitol to take his oath of office.

FROM THE 1820S till the 1840s, Jackson and Adams bracketed American opinion regarding the most important political development of their era, the emergence of democracy. Adams believed that ordinary Americans weren't fit to govern themselves, that left to their own ignorance they would choose military heroes and demagogues who told them what they wanted to hear while leading them where they had no business going.

Jackson believed just the opposite. Democracy wasn't a perversion of the republican promise but its perfection, or at least a large step toward perfection. The point of republicanism was to make government responsible to the people who lived under its laws. Whatever diminished responsibility was monarchy or aristocracy, and if the American Revolution had been about anything, it was about throwing off those twin incubi of despotism. Democracy made mistakes; Jackson didn't deny that. But its mistakes were the honest and correctable mistakes of human misjudgment, not the entrenched mistakes of selfish elites. Did the people know what was best for them? Not always. But they knew better than anyone else knew for them.

The question of Jackson's day—as of every day since—was who was right, Adams or Jackson? In the mid-1840s,

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as Congress debated the slavery question, it was difficult to tell. Adams saw slavery as the acid test of American politics, and he perceived the acid eating through the Constitution, the Declaration of Independence and everything Americans held, or ought to hold, dear. He saw section replacing nation in the affections of the people, and civil war the near-certain result. The prospect was deathlike.

Jackson observed the same events but interpreted them differently. Slavery wasn't the issue; sectionalism was. Jackson defended slavery, in part because he couldn't envision the political economy of the South without it, but mostly because he perceived the attacks on slavery as threats to the Union. The abolitionists might not intend to shatter the Union, but that would be the result of their actions. South Carolina had almost seceded over a tariff; how much more dangerous must it consider attempts to abolish the institution on which its whole way of life rested? Nor would South Carolina be alone on this issue. Its Southern neighbors would feel compelled to rally to its side. Jackson relied on democracy to resolve the slavery dispute, if not at once then ultimately. The Northern states had abandoned slavery peacefully when a majority of voters there decided slavery no longer served their interests. When a majority of voters in the Southern states decided the same thing, slavery would end in the South. To force the issue was to assert that the people couldn't be trusted with political power. Jackson could never accept that.

Jackson's devotion to democracy was unsurprising in one born of the people and bred in the school of hard experience. He trusted the people because he was one of them, in a way none of his predecessors in the White House had been. His attachment to the Union was more difficult to explain. On most subjects his politics aligned with the traditional states' rights preferences of the party of Jefferson. Throughout his presidency, on such bellwether issues as the Bank of

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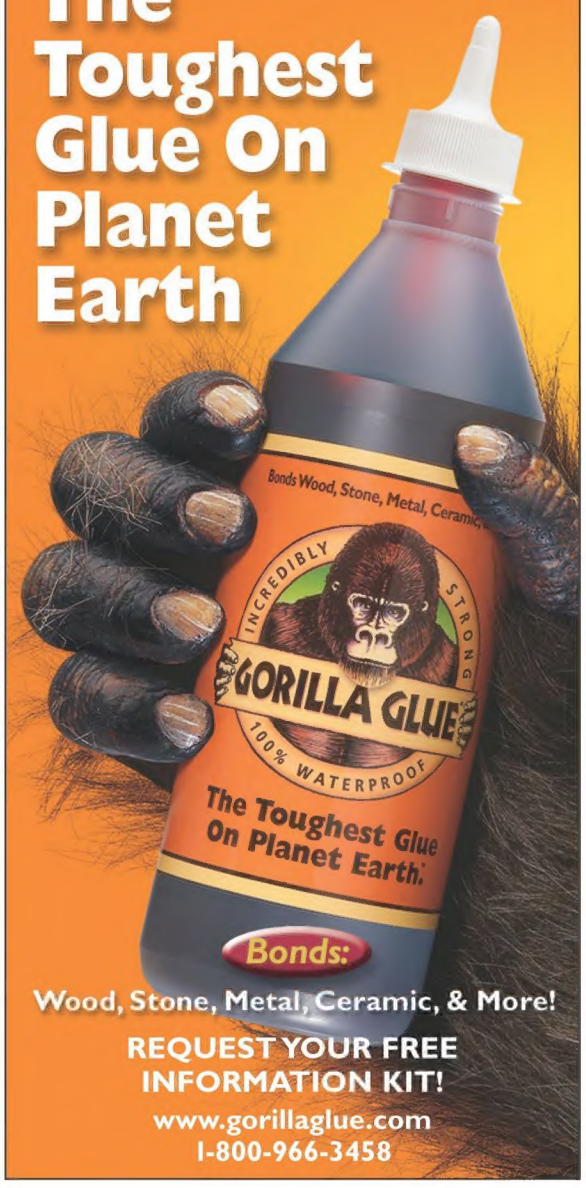

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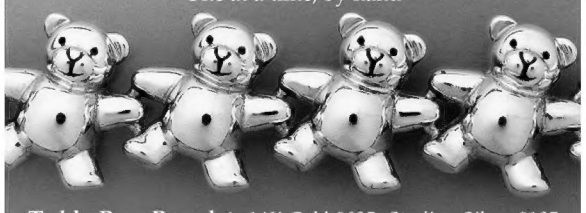

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the United States and internal improvements, he checked those in Congress who would have exceeded what he considered the proper bounds of federal authority. But he drew the line—a bright, sharp line, defended by arms if necessary—at anything that even hinted at secession. He would die with the Union, he said at the time of greatest strain with South Carolina. And he would take many with him.

Jackson's devotion to the Union was at least as much emotional as it was political, at least as reflexive as considered. Sometime in his early life—perhaps when the blood from that British saber wound streaked his face, perhaps when his mother and brothers died and he found himself alone, perhaps when he crossed the mountains to the frontier West—he became peculiarly attached to the cause of his country. Lacking a family, he identified with the American people. Jackson's enemies weren't wrong to describe him as a military chieftain, but they misunderstood what this meant. His deepest loyalties were not to friends and relations, except for Rachel; nor even to his Tennessee neighbors. The clan of Old Hickory, the tribe of Sharp Knife, was the American people. Whatever endangered them—the designs of the British, the weakness of the Spanish, the resistance of the Indians, the conspiracy of the nullifiers, the agitation of the abolitionists—elicited an immediate response, and sometimes an intemperate one.

Yet there was more to his sensitivity to slight than his heredity and personal experience. If Jackson defined life as a struggle, it was largely because life for Americans in the late 18th and early 19th centuries *was* a struggle. Eventually, of course, the United States would turn out to be the great power of the Western Hemisphere and then of the world. But during Jackson's lifetime this outcome was neither obvious nor inevitable. In his youth America had to struggle for its very existence against the most powerful empire in the world. Till his middle age it was beset by

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Britain, France and potentially Spain, not to mention the numerous Indian allies of the Europeans. His victory at New Orleans meant the United States wouldn't be torn in two, but the country might still be hedged about by enemies and weakened at the borders.

Nor was the danger only external. Divisions within could be as lethal as assault from without. John Calhoun might consider states' nullification of federal law a constitutional issue, but for Jackson it was an existential question—in the literal sense of whether the nation would continue to exist. American life was precarious enough with the country united; with the country broken apart, the pieces would fall prey to those greedy foreigners, and to each other. His willingness to wage war against the nullifiers signaled his conviction that in a dangerous world—the only world he knew—unity was the closest thing to a guarantee of security.

Jackson's appeal to the American people was the appeal of the chieftain to the tribe. They loved him because he was their protector, their hero. But they also loved him because he embodied their hopes and fears, their passions and prejudices, their insight and their ignorance, better than anyone before him. By the standards of a later day, Jackson's democracy had far to go. The "people" he and his contemporaries spoke of were almost exclusively adult white males. But even this minority of the American population signified a tremendous expansion of political participation since Jackson's youth. Democracy, as he would have been the first to admit, was a work in progress. The American people agreed, and they were happy to march forward behind him. They chose him for what he was, but equally for what they were. His strengths were their strengths, his weaknesses their weaknesses. Democracy was—and is—a leap of faith. They placed *their* faith in him because he placed *his* faith in them.

H.W. BRANDS is a professor of history at the University of Texas at Austin.

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THIS SIDE OF PARODIES

SEVENTY-FIVE YEARS AGO, A NATIONAL ICON WAS BORN. THE SENDUPS STARTED ALMOST IMMEDIATELY

Perhaps no work by a U.S. painter has been parodied more than Grant Wood's *American Gothic*, which was unveiled in October 1930 at the Art Institute of Chicago. Many critics have said his version of rural life was itself darkly satirical, but Wood, a native Iowan who died in 1942 at age 50, insisted he portrayed "good and solid people."

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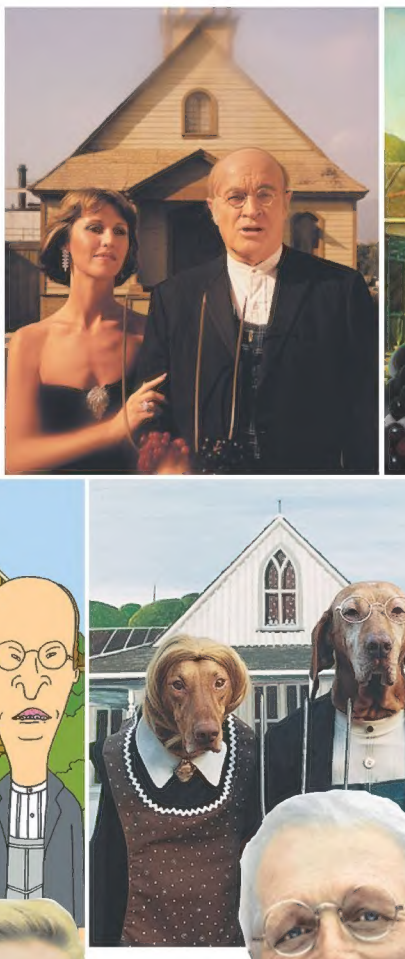

An actual Gothic-style house in Eldon, Iowa, inspired the painting, but Wood based the farmer and his daughter on a Cedar Rapids dentist and Wood's own sister, Nan. Ironic? Maybe. Iconic? Definitely. First row: Archie and Betty in a 1993 *Archie* calendar; Donny and Marie Osmond in a 1978 TV sketch; Bob Hope and an unidentified companion in 1981; Larry Moss' balloon "airigami." Second row: Paris Hilton and Nicole Richie in TV's "A Simple Life" (2003); Elizabeth Taylor and sixth husband, John Warner, in 1977; MTV's Beavis and Butthead (1996); photographer Jeanne Heilman's vizsla dogs (1990); Miss Piggy and Kermit (1984); Paul Newman and daughter Nell for "Newman's Own" organic foods (1993).

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